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Outdoor learning at school



Soil Conservation Service, U.S. Department of Agriculture

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The world as a book... August 1970 Vol. 36, No. 1

From tiny school-lot corners to whole forests—educators are looking to nearby outdoor areas for "classrooms without walls." Aware that environmental understanding is needed more each day, they are moving to put "the outdoors" in every school subject and to put every student in the outdoors.

Educators and conservationists share the belief that tomorrow's tough resource decisions will require adults whose knowledge matches their concern.

This month's articles are a cross section of progress in faculties and facilities for environmental education.

In West Virginia (p. 3) and Iowa (p. 8), summer workshops show teachers about the outdoors and how to use it as a teaching tool.

In California (p. 9), a 1,200-square foot environmental study center has a model conservation farm and produces thousands of study aids each year. In Washington, D.C. (p. 12), an area not much larger has been transformed into an outdoor classroom by students and teachers working with SCS.

In Michigan (p. 10), 17 school forests were planted by students in the 1930's, and now students help maintain them.

Other action . . .

A theme shouldn't and doesn't make a whole issue. Check through the rest of this month's offering for a sample of the varied work of SCS and others—from wildlife to waterspreading, from ponds to pangolagrass.

COVER: As more and more schools gear up for learning in the outdoors, more students are finding patterns and purpose in nature—such as these gramagrass spikelets in New Mexico.

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School districts share cost of conservation learning outdoors

By James S. Bennett

Now state conservationist, SCS, Morgantown, W. Va.
Formerly assistant state conservationist, Columbus, Ohio.

Three Ohio school districts are sharing the costs and challenges of conservation education for 15,000 students and 700 teachers through the Tri-District Outdoor Education Project.

The program does much more than teach conservation to science and biology students. It is aimed at developing an understanding of the natural environment and of conservation principles—for all the students in those districts.

The result is a comprehensive program for all students in participating schools in the Worthington, Westerville, and Grandview school districts.

A converted shelter house in the Worthington district is headquarters of the project staff. Two outdoor teachers and a project secretary assist Eugene Knight, project coordinator.

"We help science, history, and math teachers, and others who want to teach students to appreciate and enjoy a clean, wholesome environment," Knight explained. "We want them to know more about birds and their habitats and perhaps most of all to learn the things that we must do to maintain a quality environment."

Students in primary grades are involved in activities that emphasize

awareness and appreciation. Upper elementary students take part in studies of specific environmental conditions and problems.

All fourth graders participate in outdoor study units designed to introduce them to the outdoors as a laboratory for learning. The staff of the Tri-District School Project sends background material to all fourth grade teachers for preparatory study. Each class has at least one half-day session in the lab with a Tri-District teacher.

From fifth to ninth grade, teachers use the outdoor approach in teaching biology, sociology, history, geology, and other subjects.

Teachers may take classes to one of several outdoor study sites. Most often visited is the 35-acre Worthington Outdoor Laboratory at the Tri-District headquarters.

One of the most intriguing areas is a pond at Brookside Elementary School. Here students learn about fish pond management, aquatic life, and wildlife plantings. Soil Conservation Service specialists provided information and engineering help through the Franklin Soil and Water Conservation District to build the pond and develop the surrounding area.

An executive committee made up of superintendents from the three

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Learning about the environment includes collecting litter samples (above), water from a polluted stream (above right), and weather data (right).

schools meets each month. With Knight, they set up program objectives.

"Outdoor Education" is a news sheet published every 2 months. Guest editors offer details of projects that may prove interesting. A recent issue contained titles such as "Watch for Animals to Come Out of Hibernation," "It's Sugaring Time," "Feed the Birds," and "A First and Second Look at Frost."

Outdoor education workshops are a feature of the Tri-District effort. Federal assistance under the Elementary Secondary Education Act eases the financial burden for teachers to attend.



The citizens of Westerville, Worthington, and Grandview are enthusiastic about their joint effort in outdoor education. Together they offer many advantages that one school alone could not provide. •

Outdoor labs built for all county's schools

The 1,600 children in West Virginia's Ritchie County found outdoor classrooms beckoning last fall when they returned to school.

In the vacation months all public school grounds in the county underwent a reshaping for conservation learning.

Paul Siegrist, assistant superintendent of schools, said the idea came to him while he was principal at Cairo School. Because of daily injuries to children on the graveled playground, Siegrist asked the Parent-Teachers Association to take the lead in beautifying the grounds.

When Siegrist told District Conservationist Shelby Van Scoy of the Soil Conservation Service about his plan, Van Scoy explained services available from state and federal agencies.

The plan, with many agencies and groups helping, took shape in early 1969. SCS Field Biologist William Melven and Agronomist Frank Glover, both of Morgantown, helped to plan trails, study areas, and remedies for school-site problems. Clifford Collier, landscape architect from West Virginia University, drew beautification plans.

The PTA took on the job of maintaining the outdoor laboratories.

Since Ritchie County is one of five counties in the Little Kanawha Resource Conservation and Development Project, a local program guided by SCS, RC&D funds were available to treat critical areas on the school sites.

The outdoor laboratories range from 1.6 acres at the Smithfield School to more than 400 acres at Cairo. And at Cairo there's no longer the lineup for first aid. There's a new, safe playground. The old graveled playground is now a beauty spot. •

Boise College repeats environmental workshop

I daho teachers again have an opportunity to study the environment and learn how to take advantage of the out-of-doors as a teaching tool in the third annual Boise State College Workshop on environmental education.

The week-long workshop is sponsored by the college in cooperation with the Idaho Advisory Committee on Environmental Education. A picturesque 4-H camp in the pines along the shores of Lake Cascade is the setting.

Participating teachers may earn either one or two college credits in the workshop. A second credit requires an additional paper and lesson plan done around a project chosen by the teacher.

The workshop is under the leadership of Dr. Donald J. Obee, chairman of the Division of Science and Health at the college. Hal Mickelson, conservation educator for the Forest Service's Intermountain Region in Ogden, Utah, serves as interagency coordinator. Technical studies are supervised by Soil Conservation Service, Forest Service, Agricultural Research Service, and Idaho Fish and Game Department personnel.

Subject matter emphasizes elementary education needs and the ways in which environmental concepts can be presented to children by integrating the ideas into classroom lessons and through the use of the out-of-doors.

After an introductory discussion

of environmental concepts and current thinking on environmental education, the teachers spend most of the week in outdoor laboratory sessions. They form small groups and work on such projects as soil, forestry, wildlife, weather, watersheds, aquatic biology, and soil-waterplant interactions.

A field trip to the top of Snow Bank Mountain takes the teachers through successive life zones, from the valley floor to subalpine conditions. At the mountain's top the teachers measure snow depth and check water content in a large drift that remains through August. They observe logging operations and timber restoration on national and state forest lands.



Teachers check snow depth and water content on Snow Bank Mountain.



An SCS soil scientist shows how to find out what a soil is like.

Another field trip leads the teachers to the farm of Tom Fleming, a cooperator with the Valley Soil Conservation District. They spend a half day studying over the Fleming conservation farm plan and hearing the farmer explain his use of conservation-management practices on pasture and hay land. From his experience as a county commissioner, the farmer is able to relate some of the problems in resource planning encountered in a rural county. Other stops on the trip include a fish hatchery, a sawmill, and a state park. Environmental principles are discussed at each

The 1970 workshop differs only slightly from the other two. Instead of partial funding through the U.S. Office of Education, as was the case in 1968 and 1969, the workshop has become an integral part of Boise State College's summer school. The school's administration regarded the workshop as too worthwhile to lose when federal funding was discontinued.

Teacher reactions at the end of the 7-day experience have been overwhelmingly enthusiastic. One teacher said, "For the first time I feel I can take my students into the out-of-doors and be able to show them how to explore and learn for themselves."

Encouraging is the number of followup requests from teachers after they return to their classrooms. In nearly every case they have set up their own environmental education program—often involving the entire school system.

A side benefit, growing out of association with the interagency committee during the workshop, is that the teachers attending know where to get help in obtaining materials and services. As a result, local interagency committees are being formed throughout Idaho to give whole school systems the kind of help the teachers themselves received at the workshop.—R. NEIL SAMPSON, information specialist, SCS, Boise, Idaho.

Classroom

I n effect it's an outdoor classroom on wheels.

It's an exhibit-size model school site which has been rolling from location to location in Northeastern States for more than a year.

It started as an exhibit at the Philadelphia (Pa.) Flower Show in 1969 with six mallard ducklings on a tiny pond serving as a major attraction. Its next viewing was at the Virginia State Fair in Richmond. Then in March it opened at the Providence (R.I.) Flower Show.

The tally of those who have seen



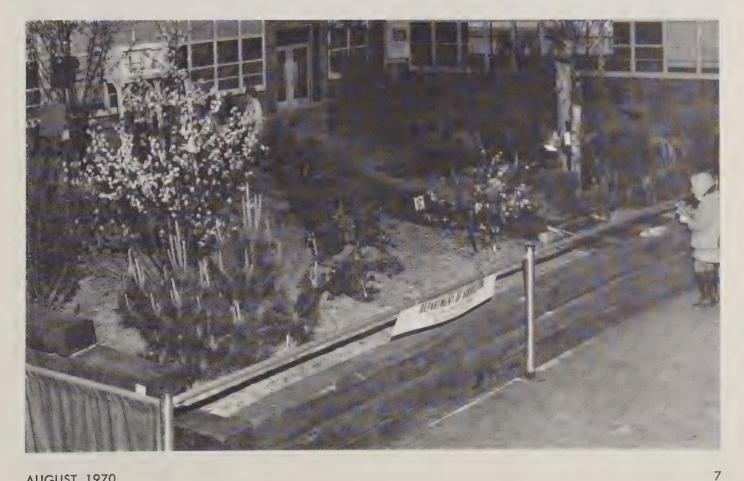
on wheels

the exhibit now tops 200,000, its Soil Conservation Service designers estimate. The viewers included scores of educators interested in developing outdoor classrooms for children to learn about natural resources and improving the environment.

The exhibit is modeled after an outdoor classroom at Freehold (N.J.) Elementary School. For the showings, conservation shrubs were prepared in greenhouses to be seen at seasonal peak.—Gordon L. Leckie, Field Information Unit, SCS, Upper Darby, Pa. ♦



Conservation district supervisors and SCS work together (above) constructing the prize-winning exhibit (below). Mallard ducklings (below left) were a main attraction.



Voices of the "Turtles" tell conservation story

By Susan Stanfield

First grade teacher, Roosevelt School, Davenport, Iowa

We Iowa teachers went to Springbrook Conservation Camp near Guthrie Center, Iowa, to learn about land, water, trees, and wildlife.

We ended up becoming "Turtles." A turtle, you see, is the mascot of the camp, and the students affectionately call the place Turtle Camp.

The 3-week program with field trips, conducted by Soil Conservation Service specialists and others, stressed a different phase of conservation each week: Forestry, soil and water, and fish and wildlife management.

The intent was that we Turtles would share our conservation knowledge and experiences with children and adults across the state, helping to bring about a broader understanding of conservation techniques and principles.

A trip to Sheeder Prairie, a virgin Iowa prairie, brought new understanding of soil and plant relationships

On the trip to Goose Lake, we entered the marsh in an airboat and were dumped out to explore the wonders. We gained a new appreciation as we waded into 10-inch-deep muck and struggled with the chest-high weeds. We found none of the foot-long leeches we had heard about. We enjoyed the excursion in spite of early fears.

The visit to Holst State Forest and the Wildlife Research and Exhibits Station at Ledges State Park tied the program together.

The real benefits from Turtle

Camp came after we got home. In applying in the classroom what I learned at camp, I use the same techniques—seeing and touching, exposing and doing. It works with first graders, too.

Seasons serve as guidelines for selecting subject matter. In quickening the children's natural interest in nature, the trick is to capitalize on curiosity, lead their questions, then carry them forward with a challenge.

For example, when we decided to look for signs of spring, we started with a general discussion, and then my spring nature detectives went into action. Judy found a book in the library about birds. Martin brought in a sparrow's nest. With these came questions — "How come?" "Why . . .?"

Here was my opportunity. A bulletin board showing local birds and their homes, charts showing nests and choices of habitat, SCS booklets showing how landowners provide food and cover, all were explored for answers.

To be helpful to our bird friends we decided to bring in nesting materials and build a nest. Simple? Yes. Sophisticated? Definitely. After several attempts, we decided Mother Robin could do the job better, but we had learned to appreciate her life, habitat, and customs.

When my young conservationists invited a professional conservationist to class, he was bombarded with questons. "How do birds build their nests?" "What can we plant to help them find food and nesting materials and why are nests built at different heights?"

"What does the father bird do?" demanded Randy when the questions seemed to dwell on the female too much. Another boy, after examining a wooden birdhouse, inquired, "How do they make those wooden houses?"

Questions and comments from the class served as the best guides for planning. Moving from birds to plants to land, the children were alert, aware, and interested. They aren't afraid to be enthusiastic and inquisitive.

Enthusiasm is contagious, and it bounces from teacher to child and back to the teacher again. Teacher is the source but steers the project with as light a touch as possible. Most children will challenge themselves.

The teacher's reward? More questions! And a greater depth of understanding by the students. None is too trite or delicate for response for they provide learning opportunities.

When questions lag, it is time for teacher to prod and prompt again, this time with a new angle or a new season. These queries ultimately touch water quality, land management, soils, trees, grass—and the whole concept of conservation enters the young mind.

In the thick of the questions we Turtles begin to apply our own camp experiences in relating the subjects to our curious young conservationists. Here we begin to spread the word about conservation and at more than a turtle's pace.

Mini-center opens conservation doors

An environmental study area, given the name "Conservation in Miniature," is a practical, challenging, and economical conservation study project in Los Angeles, Calif.

It was developed by Ralph Turner, elementary science specialist in charge of the Monlux Science and Conservation Center for the Los Angeles Unified School Districts.

Conservation in Miniature is only a part of an innovative conservation program developed 7 years ago within the limitations of budget and personnel common to many urban school systems.

Turner contends that any school district can duplicate the Monlux program at little expense. Conservation in Miniature cost only \$150 to \$200 in basic materials. It can be adapted to fit local conservation patterns of any part of the country. Volunteer personnel can be recruited and trained from within the community.

The center's outdoor environmental area totals about 1,200 square feet. One part contains "working" and "living" examples of scientific conservation on the farm. The visiting school children develop an awareness of the value of farm practices such as contour farming, terracing, waterways, windbreaks, and conservation grazing. A model of the Los Angeles basin flood-prevention project adds to their understanding of water conservation and management.

The center's teacher resource building contains environmental resource materials and publications dealing with soil, water, plants, wildlife, and minerals. Thousands of instructional aids are produced in packet form each year for teachers to help relate conservation to the state textbooks. Two thousand earth-science kits of investigational materials for children are assembled and distributed each year.

Through the years Monlux has had only one laboratory-type environmental classroom staffed by a qualified teacher. Now there is a second classroom staffed by trained volunteers. The new facility is equipped to involve children on an investigational or experiencing level.

Directors of the San Fernando Valley Soil Conservation District have made the Monlux Center part of their program in conservation education by preparing a giant-sized, full-color postcard which pictures the Conservation in Miniature area. It is distributed, with additional information about the center, to conservation districts in California and other states.

The San Fernando District, which was formed in 1944, now includes densely urbanized segments of Los Angeles. This means that the Monlux Center is a useful conservation program for the city-dwelling childen of the area's school districts.— EURSELL S. CORDELL, district conservationist, SCS, Lancaster, Calif. •

Model farm shows many practices that prevent erosion and improve farming.





By William M. Allred District conservationist, SCS

Grand Haven, Mich.

Trees

teach

that

Pines planted 20 to 25 years ago on school-forest land are ready to prune and thin.

10

School forests in western Ottawa County, Mich., have for more than 30 years proved their value as renewable, instructional resources.

They are part of an outdoor education program initiated by the West Ottawa Soil Conservation District soon after its formation in 1938, when the County Board of Supervisors leased 2,000 acres of land to the district for long-term stabilization work.

The original forest in western Ottawa County had been cut or burned over between 1840 and 1900—some of it to rebuild Chicago

after that city's great fire. Later, farming operations depleted organic matter in the sandy soils and dune areas. Families moved away when the soil began to blow.

Many of the teachers and school children who stayed in the area helped the district cope with drifting sand by planting new trees. The district leased 17 tracts within its 2,000 acres of county land to schools for 50 years. Students and teachers then planted mixed pine seedlings furnished by the district's nursery in each school's forest of the future.

Clarence Reenders, chairman of the district board of directors (who has served on the board continuously since 1938), recalls:

"I drove many miles with my old Ford hauling kids and trees. We furnished the ice cream and they planted trees."

Most of the small schools have been annexed by larger systems, but they are still involved in the project.

"Each year we expand our outdoor education program," Reenders said. "At the present we are working with 44 schools in Ottawa County. Each signs up as a coopera-

SOIL CONSERVATION

tor with the district and is thereby entitled to technical assistance from Soil Conservation Service."

Soil maps and planning aids are ordered for each school site. Problems and possible projects are discussed after the school administrator or his representative has walked over the site with conservationists. Each school is directly involved in the preparation of a plan tailored to its conservation and educational needs.

"As we work with schools, we enjoy the enthusiasm of the administrators and teachers involved. The wide range of activities possible in an outdoor classroom seems almost unlimited," Reenders said.

Trees in most of the school forests are now large enough for pruning and thinning. Several summers ago, Grand Haven schools sold 5 cords of pulpwood per acre after they had worked on their forests. The income paid for most of the timber-stand improvement.

The Ventura School for handicapped children makes good use of the Beechwood School forest, a 35acre pine plantation. Older boys prune crop trees selected by the Michigan Department of Natural Resources forester. Pruning limbs off trees up to 17 feet makes it possible to eventually harvest sawlogs that can be cut into lumber free of loose knots.

"It gives the boys something to do as well as a feeling of accomplishment," says Harold Knoll, who is in charge of the program.

Each year Christmas trees are harvested and sold from the Robinson School forest operated by the Grand Haven schools. The project is carried out by the senior high school marketing class. Students cut, bundle, haul the trees to Grand Haven, and set up sales lots. They determine prices and make sales. Proceeds are used by the school to finance other conservation activities.

"We try to relate conservation of natural resources to as many subjects as we can," Jack Barendse, Peach Plains School principal, said. "The school forest is an excellent place to teach children about their environment. It is valuable in teaching esthetic appreciation as well as responsibility for maintaining natural areas for erosion control and wildlife habitat."

Last year Grand Haven, West Ottawa, Hudsonville, and Coopersville schools planted 100 wildlife packets of 100 plants each on their school grounds under district supervision. These will provide wildlife food and cover and add to the value of the outdoor classrooms, too.

Indoor support for these outdoor programs can be found in the visual aids library of the Ottawa Area Intermediate Schools. Urban and rural schools throughout Ottawa County use the library's wealth of material on conservation and other subjects.

Since 1942, students from urban and rural schools have toured the county to see conservation practices.

One year as many as 1,200 students took part. The tour is sponsored by the district in cooperation with the Ottawa Area Intermediate School District, the Ottawa County Extension Service, and the Soil Conservation Service.

With the support of these agencies and continuing interest on the part of the schools, the district's school forest program will probably continue to grow as sure and strong as those first trees set more than a generation ago. •



Signs like this mark school-forest sites in the West Ottawa District.



Green School – environment of another kind





Teachers and students joined in creating their outdoor classroom around Green School. On the wooded terrace and bare, sloping land students entered eagerly into the work of planting grass and shrubs.

At left, teachers and students review conservation plan with Ernest Moody of SCS.

T o a child in a city's center, environment is pavement, traffic lights, and the smell of auto exhaust.

At Mildred Green Elementary School in Washington, D.C., the students now know environment of another kind, where they learn about soil and water, and where they walk a nature learning trail to touch, smell, and study flowers, leaves, and trees.

The Green School outdoor classroom project has the enthusiastic cooperation of Principal Vandy Jamison and a group of dedicated teachers, with the firm support of the District School Board.

When the board's science supervisor decided on Green School as the site for a pilot project for a center-city school site development 2 years ago, the Soil Conservation Service in nearby Maryland furnished a conservation plan for the grounds, with technical help and the services of District Conserva-

tionist Ernest Moody to work with the teachers and students in using the outdoor classroom.

Green School happened to have more land than most center-city schools, but it also had more problems with erosion and surface water runoff.

Students planted grass on eroding slopes behind the school. They planted pine seedlings, autumn olive for wildlife food and habitat, and forsythia for beauty. Thickgrowing crownvetch stabilized the most seriously eroding areas.

The School Board built a retaining wall to hold a steep bank in check. Next spring the students will plant Memorial Rose along the wall's top.

With the conservation plan for the site as a guide, the whole area is used as a teaching laboratory where city children are learning about a kind of environment they hadn't known before.





Even a decaying stump (above) holds an environmental lesson. A student (left) caresses the petals of a shrub he helped plant.

Waterspreading – a way to soften hard times

Conservationists call it waterspreading. The idea is based on a physical fact: If you don't use the water when it is there, you probably won't get a second chance.

In South Dakota, where water is regarded with special respect, the farmers and ranchers in two conservation districts have been developing waterspreading systems to make use of water that, the way they look at it, might otherwise be wasted.

Waterspreading, they point out, doubles hay yields. The increased hay stabilizes farming operations by providing feed reserves for periods of dry weather.

More than 7,000 acres now benefit from waterspreading in the Tri-County and Ziebach County conser-

vation districts. Soil Conservation Service specialists have worked with the operators, designing the systems to fit the land and suggesting land treatment as needed.

The system on the Two Rivers Ranch collects water from a 34-square-mile drainage area. The water is delivered to 280 acres of western wheatgrass pasture by a network of dikes and ditches.

The system designed for Guy Schickedanz in the Ziebach County District includes a dam with a 2-foot headgate that automatically puts a foot of water on 41 acres of grass. Schickedanz' \$3,200 cost for the system was shared through the Great Plains Conservation Program.

Lawrence Woodward, near Dupree, uses a combination system to

water 500 acres of grass and alfalfa. When water is available in Bear Creek, Woodward pumps the water to cover 140 acres of alfalfa. Two dams in another section of the ranch hold water for Woodward's western wheatgrass. The cattle harvest the hay in late fall.

On the Cecil Vig place, in Meade County, a dam pierced by a corrugated metal pipe waters 30 acres of grass to depths up to 2 feet. On another section a pumping system puts water on alfalfa. Levees spaced to hold water up to 1 foot on the land were designed by SCS engineers.

South Dakota laws require a landowner to have rights to any water he draws from a stream with more than a 160-acre watershed. Rights are usually granted after proper application, advertising, a hearing with no objection voiced, and the payment of \$8.00 in fees.—Verdette R. Thomas, district conservationist, SCS, Faith, S. Dak.



Water from a 34-square-mile drainage area makes a hay crop more certain on this 280-acre field of western wheatgrass.

Best of all worlds

Pat Hunt and Bonnie Proctor, television teachers at KCTS-ETV in Seattle, Wash., discovered they needed help when they started work on a conservation education series on man and his environment.

They had excellent help with the teaching concepts of the series. But they found they lacked information on technical aspects of conservation, ecology, and environment.

When they noted that photographs that caught their eye in conservation books were taken by Soil Conservation Service personnel, they turned to the Field Information Unit of SCS for help.

The result is a series of 32 programs entitled "The Best of All



Pat Hunter (left) and Bonnie Proctor of KCTS join Duane Bosworth of SCS in one of 32 educational programs.

Worlds."

The series stresses the importance of intelligent use and management of natural resources for a healthful, productive, and beautiful environment. It is designed to give 450,000 Washington intermediate school children a broad background in resource relationships and conservation principles.

Letters say thanks for tree planting

In Albuquerque, N. Mex., where he is soil conservationist for the Soil Conservation Service, Al Martin has acquired a widening circle of young friends.

He became aware of his new popularity after arranging several planting projects for local schools. He used native woody plants and trees from the Las Lunas Plant Materials Center of SCS.

One primary class expressed its

appreciation in letters—40 of them—with envelopes decorated with sketches of trees, shrubs, and flowers, all in color.

Karen Celum wrote: "Dear Mr. Martin. Thank you for our trees. We are going to have an outdoor classroom. Our school is going to have a beautiful school now."

And Raymond Saavedra's note said: "Dear Sir: I would like to tell you thanks for the trees. It was fun

while it lasted."

Ruthie Pacheco's note was somewhat more lavishly illustrated than others. "Dear Mr. Martin," she wrote. "I really appreciate those most wonderful flowers and trees you brought for us. We really enjoyed planting those trees. And also thanks for helping us. . . . Now that you brought us those plants our school will be the most beautiful school in the world."

Outdoor lab is gift by city to Idaho school

Elementary school students in Peck, Idaho, study conservation practices and principles in their own outdoor laboratory on city park property near the school.

The pupils planted 12 species of grasses in staked-out plots near their arboretum area. They will observe growth and development.

Wildlife studies will be made in the wooded portions of the park. An abandoned motorcycle trail up the hillside gives them an opportunity to study the effects of erosion.

The city of Peck donated the park area for the outdoor laboratory. In return, the students are cleaning up the park and planning a variety of plantings of trees and flowers to improve the park land. Teachers, parents, and community residents have helped.

Technical assistance was furnished by the Department of Public

Lands, Idaho Fish and Game Department, Federal Extension Service, Agricultural Stabilization and Conservation Service, and the Soil Conservation Service. Service to the outdoor laboratory were coordinated through the Rural Development Council. The specialists also prepared a teaching guide to give the students a broad understanding of environmental relationships in the conservation studies.

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Planting a windbreak is a time for learning

California

I nstructors, students, and the Soil Conservation Service staff worked jointly with a California rancher to plan for and plant trees and shrubs for field windbreaks and wildlife.

Don Dow had wanted for 3 years to make a windbreak-wildlife planting on his Honey Lake Valley ranch near Susanville. He never found the time for it, because his operations included 700 acres of irrigated land in grain, hay, and pasture; 200 head of beef cattle; and a licensed duck club and pheasant shooting preserve.

Then in 1969, instructors and students of the classes in forestry and agriculture at Lassen Junior College and SCS employees worked with Dow to plan a tree-shrub planting for the following year.

Plants were ordered from the California Division of Forestry Nursery. Dow prepared a seedbed, installed ditches for irrigation, and fenced the area to be planted to exclude livestock.

The students planted more than a

mile of three-row windbreaks of Jeffry pine, Russian Olive, and Caragana (Siberian pea-shrub).

According to one forestry instructor, John Hamilton, "This project provided some firsthand experience for the class in planting seedlings and helped acquaint them with trees and shrubs suited for a wild-life-windbreak planting." — Jesse Langdon, district conservationist, SCS, Susanville, Calif.

North Dakota A good life for both— wildlife and the farmer

Victor Muggli, who farms 1,630 acres near Glen Ullin, N. Dak., is convinced that wildlife and man can subsist in harmony on the same land. His farm is proof.

He has set aside parts of his acreage for wildlife use. He seeded 420 acres under the Cropland Adjustment Program of the Agricultural Stabilization and Conservation Service to grass for wildlife. Creek bottoms, odd corners, and damsites,

protected by more than 5 miles of fence, add up to about 430 acres managed primarily for wildlife food and cover. Twelve of the 14 dams Muggli built are for wildlife. Several impoundments are stocked with fish

A large tree planting is underway to protect wildlife and the Muggli farmstead. And Muggli plants clumps of trees for wildlife in scattered areas.

Wind stripcropping, spring development, crop residue management, proper use of range, and cross fencing are other marks of the conservation farmer on Muggli's place.

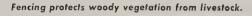
The wildlife improvements already have helped to increase numbers of deer in the area, and the dams now are producing duck broods each year as well as providing excellent fishing.—HERBERT T. MITTELSTEDT, district conservationist, SCS, Mandan, N. Dak.

Kansas

Floodwater dam offers income opportunity

Allen Kirkpatrick of Havana, Kans., saw an opportunity for a business to supplement his farming when a flood-prevention dam was built near his place as part of the Twin Caney Watershed Project. Soil Conservation Service conservationists had decided the dam was feasi-

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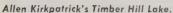






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Near Andover is beautiful Hussey's Pond.

ble for the protection of cropland and other rural property.

The city of Caney, 8 miles southeast, needed a supplementary supply of water and paid for 600 acre-feet of storage in addition to the normal capacity of 257 acre-feet of water.

Twenty-nine of the 91 acres of the reservoir are on Kirkpatrick's 624-acre farm.

Through the Chautauqua County Soil Conservation District, Kirkpatrick received technical help from SCS in planning a 56-acre land and water-recreation area. He received a Farmers Home Administration loan for the project.

An attractive sign on Highway US-166 calls attention to the recreation area and indicates memberships are available for fishing, boating, and picnicking.

A well-built access road takes visitors through the woods. Along the lakefront, Kirkpatrick built trailer camping sites and a picnic area. A boat ramp and a diving platform have also been built. The lake is stocked with channel catfish and bass.—Granville Davidson, district conservationist, SCS, Sedan, Kans.

Massachusetts

New England town acts to keep rural charm

Andover, Mass., is like most other towns. It has a choice—improve for man's use, or do nothing and decay.

State and federal natural resource agencies operating in Massachusetts have developed a way to help Andover with its conservation problems. Andover has taken full advantage of these services. The town shared with the Soil Conservation Service the cost of a soil survey with urban interpretations. Then the town's Resource Commission invited the Natural Resources Technical Team to help inventory the town's natural resources.

The team consists of representatives of the Massachusetts Department of Natural Resources (including the Division of Forests and Parks and the Division of Fisheries and Game), the Extension Service, and SCS.

The technical team prepared a report evaluating natural resources and potential for development, and the SCS district conservationist presented it to the citizens. The report showed Andover with a marked potential for recreation and conservation development area. Ample open space and woodland areas still are available, although housing development and industrial uses are in contention for land.

One of the significant natural areas is Hussey's Pond near Shawsheen Square in Andover's commercial center. Other opportunities for development center around a pond near the high school, recreational facilities at another pond, and a park extending to North Andover's

town line.

The town has approved a bond issue for a quarter of a million dollars to start its environmental program. The Hussey Pond area has been purchased to assure the maintenance of this tranquil spot. Progress has been made toward acquiring land along the Shawsheen River with a recreational complex in the plans. Conservancy zoning based on soil survey information is in the making, and other actions are on the drawing boards.

Andover will remain a pleasant place in which to live.—WILLIAM H. COATES, assistant state conservationist, SCS, Amherst, Mass., and ROBERT N. MOREHOUSE, district conservationist, SCS, Acton, Mass.

Florida districts broaden programs

Florida recently became the 23d state in which all local conservation district programs have been updated to cover broader environmental improvements.

All district programs also have been updated in Arkansas, Colorado, Connecticut, Delaware, Indiana, Kentucky, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Mississippi, New York, North Dakota, Ohio, Rhode Island, South Carolina, Tennessee, Vermont, Washington, West Virginia, Wisconsin and in Puerto Rico.

Fish pond study reveals correct management key

By Ivan L. Lines, Jr., and Verne E. Davison (retired)
Biologists, SCS, Red Bluff, Calif., and formerly in Portland, Oreg.

Fish pond owners in Shasta, Tehama, and Glenn counties in the Upper Sacramento Valley of California have joined in a Soil Conservation Service field trial to learn the cost and relative efficiency of warm-water fish pond fertilization.

Few ponds in California have been fertilized for best results. Most develop troublesome growths of submerged waterweeds that interfere with fishing. The weeds contribute little, if anything, to the quantity of fish produced.

One of the pond owners taking part in the trial is Mel Davis, a cooperator with the Western Shasta Soil and Water Conservation District. In April 1969, Davis' pond had been properly reshaped and was essentially weedless. But, by May 21 that year, weed growth began to appear again.

Davis began fertilizing the pond May 26. He placed the fertilizer on a 3- by 4-foot wooden platform submerged 8 inches. Within 72 hours, water currents and wind had distributed the fertilizer throughout the pond. This caused the growth of millions of microscopic-size algae or phytoplankton.

The dense growth of algae soon shaded the pond bottom and prevented germination and further growth of the aquatic weeds. The level of fertility was correct when there was enough phytoplankton in the water to obscure a white object at a depth of 12 to 24 inches.

By September 29, Davis had used 128 pounds of nitrogen, 160 pounds of phosphorus, and 52 pounds of potash in fertilizing the 4½-acre pond.

Davis spent approximately \$9 an acre for fertilizer. Controlling the weeds with herbicides would have cost from \$10 to \$50 an acre.

The Davis pond contained large-mouth bass and bluegills from an earlier stocking. The bass spawned successfully in 1969. Repeated spawning by bluegills, beginning in early June and ending in mid-September, maintained abundant numbers of fry and fingerlings from 34 inch to 2 inches long.

The increase in phytoplankton increases the zooplankton (animal life), the food of the bluegills. It takes about 5 pounds of zooplankton to produce a pound of bluegills and about 5 pounds of bluegills to produce a pound of bass.

With the increase in fertility and the consequent increase in plankton, fishing became excellent the first summer in the Davis pond. But the total in fish pounds per acre yielded by the pond is yet to be determined.

The fertilization program in the field trial generally followed the recommendations in USDA Farmers' Bulletin 2210, Warm Water Ponds for Fishing. The bulletin recommends the use of inorganic fertilizers with a nitrogen-phosphorus-potassium ratio of 8-8-2. Commonly available pasture and orchard fertilizers in California were substituted to approximate that ratio.

In the Sacramento Valley, seasonal temperatures of pond waters and the commonly occurring waterweeds are similar to those in the Southeastern States. Problems and opportunities for good management appear to be similar to those studied by Dr. H. S. Swingle and his col-



Mel Davis checks his pond's water clarity, a clue to fertility levels.

leagues in Alabama. Davis' experience indicates that some western waters may be more fertile than ponds in the Southeast. Southeastern ponds require an average of 60 to 80 pounds of nitrogen and phosphorus an acre of surface, compared with the 25 pounds required by Davis' pond. This lesser requirement has been partially verified by experience with other ponds in the study.

The key to evaluating fish pond stocking and fertilization practices will be the management and harvest records of fish pond owners. Such records should include surface area, degree of erosion, waterweed problems, fish stocking, water temperatures, responses of various types, amounts of fertilizer, spawning dates, and the pounds of fish removed.

From this information researchers can determine costs and yields at two levels of management—the unfertilized pond with its growth of weeds and the adequately fertilized pond, weedless and providing greater fishing success.

City folk beat trail to these farm cabins

By John R. Swanson

District conservationist, SCS, Harrisville, Mich.

No rat race of neon lights, no waiting lines or horns. A vacationer's dream? Maybe, but at the Robert Reames farm it is a reality for those who rent his vacation cabins.

Add the personal touch of Bob and Jenny, and the dream is complete. And you can't beat the Reames' baked goods and fresh vegetables!

The 280-acre Reames farm is in Alcona County in northeastern Michigan. Within a few hours by car are cities such as Flint, Saginaw, Detroit, and Toledo.

Reames is a past director of the Alcona Soil Conservation District. It was in his term as a director that he talked over his vacation cabin idea with Dean Gordon, area conservationist for the Soil Conservation Service.

In August 1966 the Reames built a dam that made an attractive pond on unproductive pasture. SCS engineers designed the dam and supervised the work. The design for an A-frame cabin also came from SCS. Trees bought and cut from nearby Huron National Forest property were sawed into lumber at a local sawmill. Reames completed the first of three proposed cabins in July of 1967.

An ad in a Detroit paper brought the first guests. It was the beginning of many new experiences and friendships for the Reames.

That first November a heavy snow clung to the cabin and the

conifer trees around it. The scene became the color photograph on the Reames' Christmas cards. When the cards were mailed, more reservations came for the next summer. Many people called to reserve the cabin for weekends of snowmobiling and skiing. Before leaving, some of the first guests reserved the cabin for vacation the next summer.

Reames started work on wildlife habitat along with the first cabin. In an area used for 30 to 40 years as pasture for cattle and sheep, wildlife food plots and fruit-bearing shrubs have been planted on the contour in the open areas. Carl Stamm, SCS district conservationist, helped Reames select the shrubs best adapted to his soils. Reames

planted Christmas trees between the food plots.

Two miles of nature trails wind through the 65 acres of woods and open areas that once were pasture. One trail parallels a trout stream. Stone placed in the stream has created a small waterfall.

Some of the guests spend their entire vacation at the farm. They fish, swim, or hike the trails and enjoy the outdoors. Books for identifying trees, birds, and animals are on a table. Conservation practices on all of Reames' fields provide beauty and pleasant surroundings.

Haying and other farm chores are always attractions on the farm. One evening a week is tour night. Guests join in cars for a ride through the



The A-frame is the second of three vacation cabins Robert Reames plans to construct on his farm.

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Huron National Forest. Wildlife is abundant. It is common to see a doe and fawns cross in front.

There are no signs on highways to guide customers to the Reames farm. Each guest is equipped with maps and complete directions on how to get there. The advertising is in city papers. Customers have told friends, who write for reservations.

In 1969, his second full summer of operation, Reames put only two ads in the paper. He received 20 calls after one ad. He had reservations for his second cabin before the footing was laid.

Reames' idea is to develop slowly and learn. He says recreation is a new business on farms. Those who have tried it have found that it is more than just providing facilities.

"You have to learn what the people like," he points out. "You can sell recreation at almost any price if you have what people want."

Study shows what plants deer prefer

The New Mexico Department of Game and Fish has been interested for years in seeding browse plants on game ranges. To help, the department entered into cooperative agreements with two institutions also interested in game range improvement. The first was New Mexico State University, which with the Soil Conservation Service operates the Los Lunas Plant Materials Center. The second agreement was with the Rocky Mountain Forest and Range Experiment Station.

In summer 1965, 10 species of potted plants from the Los Lunas Center were placed in a rabbit's cage. Notes were taken daily to determine which plants the rabbit preferred. This led to the idea that a deer preference study could be conducted in somewhat the same way.

In 1966 a herd of seven deer and

six fawns was located in a fenced area at Los Alamos Scientific Laboratory. The herd had lived for several years in the 80-acre pasture at about 7,500 feet elevation in ponderosa pine timber.

Ninety-nine browse plants of 16 species were transplanted into the pasture August 12, 1966. On the morning of August 13 the plots were inspected. The deer had found them. Eight of the plants had been sampled.

After 14 days the degree of plant removed by the deer was as follows: Skunkbush 62 percent, black locust 40 percent, silver buffaloberry 36 percent, honey suckle 26 percent, mountain mahogany 22 percent, Siberian elm 9 percent, desert peach 7 percent, Siberian pea 6 percent, fourwing saltbush 6 percent, and bitterbrush 3 percent. There was no use of cliff-rose, Russian olive, New Mexico olive, Apache plume, dune broom, and winterfat.

A followup study in 1967 with similar plants corroborated the first year's findings.—Samuel H. Lamb and Daniel L. Merkel, federal aid coordinator, New Mexico Department of Game and Fish, and plant materials specialist, SCS, Santa Fe, N. Mex.

Conservation and birds help control insects

With the right habitat, plenty of nesting cover, water, and food, numbers and varieties of insect-devouring songbirds can be multiplied, reports Hugh Steavenson, president, Forrest Keeling Nursery, Elsberry, Mo.

He says the nursery maintains hedge-rows or shrubs every 100 feet or so for windbreaks and for seed production. It also has many border, edge, and fringe plantings that permit a near-maximum of songbirds and other wild creatures. As a result, Steavenson says, Keeling Nursery's insect problem in growing a wide variety of trees, shrubs, and evergreens is minimal, and spraying only occasionally is necessary for some specific pest.

Meetings . . .

An anniversary and "Turning Points in Time"

The Soil Conservation Society of America celebrates its 25th year of advancing the science and art of good land use at its meeting in Toronto, Ontario, Canada, August 9-12.

Its theme, "Turning Points in Time," represents the spirit of to-day's SCSA. Speakers will cover more than 10 major topics—among them "Waste Utilization and Our Land Resources," "Current Research in Land Resource Use," "People in a Northern Environment," "Water Management and Multiple Use," and "Conservation and the City." Award presentations, technical tours, and a Silver Anniversary Banquet complete the program.

Keynote speaker will be Joseph L. Fisher, president of Resources for the Future, Inc. Other major natural resource conservationists to speak include N. C. Brady, director of research, Agricultural Experiment Station, Cornell University, Ithaca, N.Y.; Leon W. Weinberger, vice president, Zurn Environmental Engineers, Washington, D.C.; J. R. Wier, chairman, Fisheries Research Board, Ottawa, Ontario; and J. P. Bruce, director, Canadian Center for Inland Waters, Burlington, Ontario.

Agronomy Society's changing world

The American Society of Agronomy, Soil Science Society of America, and Crop Science Society of America plan a joint annual meeting at the University of Arizona in Tucson, Ariz., August 23-28.

The American Society of Agronomy is planning special symposiums on "Agronomy in a Changing World" and associated subjects. Papers in the other two societies will cover a wide range of scientific subjects.

In all, about 1,400 are expected to contribute more than 800 papers for about 120 sessions.

The Soil Science Society will sponsor a special field tour to review results of several studies of soil geomorphology in the state. Other tours, as well as special programs for the ladies, are in view.

Geographers to discuss many environmental topics

Varied subjects to be discussed at the Association of American Geographers' 66th Annual meeting in San Francisco, Calif., August 23-26, include: Urban geography, geomorphology, western landscapes, climatology, Appalachia, rural geography, community of survival, pollution, and remote sensing.

Education emphasizes quality living

"Conservation Education Quality Living" will be the theme of the Conservation Education Association's national meeting August 16-20. The group will meet in Lafayette, La., on the campus of the University of Southwestern Louisiana.

Dates and places

August 2-4, Community Development Society, University of Georgia, Athens, Ga.

9-12, Soil Conservation Society of America, Toronto, Canada

16-20, Conservation Education Association, Lafayette, La.

23-26, Association of American Geographers, San Francisco, Calif.

23-28, American Society of Agronomy and Soil Science Society of America,

Tucson, Ariz. 23-28, American Institute of Biologi-

cal Sciences, Summer Meeting, Bloomington, Ind.

28-29, The Madison, Wis. Nature Conservancy, September

13-16, Farm and Industrial Equipment Institute, Toronto, Canada

13-17, American Fisheries Society,

New York, N.Y. 14-18, International Association of Game, Fish and Conservation Commissioners, New York, N.Y.
27-30, National Recreation & Park

Association, Philadelphia, Pa. •

Review

Functioning of Terrestrial Ecosystems at the Primary Production Level. EDITED BY F. E. ECKARDT. 1968. UNESCO, Paris (distributed by Unipub, Inc., New York). 516 pp., illus. \$19.

In this scholarly volume. UNESCO delivers the results of another of its symposiums on ecology that have grown out of its Arid Zone Research Programme launched in the early 1950's.

"It became clear," Editor Eckardt notes in the foreword, "that the ecologists were much better armed to study the plant as a single item than overall vegetation; much less, therefore, the ecosystem."

Accordingly, an international symposium devoted essentially to the title subject was held in Copenhagen in 1965.

The papers of that symposium are reproduced here, the full text in either English or French with a summary in the alternate language.

Titles range from such broad subjects as "Energy Exchange in the Biosphere" and "World Distribution of Plant Biomass" to the finest technical details of laboratory and field methodology.

Both price and the technical level of the papers will keep the book from finding a place in many individual working libraries, but it is a valuable addition to the background reference material on a subject of increasing concern to conservationists.—B.O.O.

New publications

Working Together. By THE NA-TIONAL ASSOCIATION OF CONSERVATION DISTRICTS AND THE SOIL CONSERVATION SERVICE. National Association of Conservation Districts, League City, Tex. 1970. 14 p. folder. Presents a program of action by both organizations. Conservation districts are being challenged to provide assistance in community planning, making orderly changes in land use, multiple-use of resources, water-supply development and protection, soil and water management in urbanizing areas, watershed and river basin planning, reclamation of mined and other disturbed areas, pollution abatement, wildlife and recreational improvement, conservation education, and environmental enhancement. SCS, in addition to providing help to individual farmers and ranchers through its various programs in districts, has new responsibilities and authorities that embrace more kinds of land and greater numbers of land users. More recent assignments include rural development, technical assistance in urbanizing areas, soil and water pollution abatement, natural beauty, and outdoor recreation. Districts and SCS are working together in these newer areas of responsibility and opportunity as they have in the traditional field of conservation planning and application on farms and ranches.

The Biology of Poor Seed Production in Tephrosia Vogelii. By FRANK-LIN W. MARTIN AND EUGENIO CABANIL-LAS. 1970. USDA Tech. Bull. 1419. 34 pp., illus. Tephrosia vogelii Hook. f. a potential source of the insecticide rotenone, plant flowers well, but sets pods and seeds poorly in Puerto Rico. Various factors cause poor fertility, principally pollen abortion and failure of anthers to dehisce. Abortion is associated with weather conditions and may result if moderate temperatures and high humidities do not occur during the week preceding anthesis.

Building, Planting, and Maintaining Coastal Sand Dunes. USDA Soil Conservation Service Conserv. Inf. 32. 8 pp., illus. Recommends rebuilding or repairing dunes quickly if vegetative damage occurs; using sand fences to rebuild barrier dunes; spreading salt hay or other mulch material for temporary protection; planting American beachgrass; and fertilizing.

Gardening on the Contour. By THE Soil Conservation Service. 1970. USDA Home and Garden Bull. 179. 6 pp., illus. \$0.10. Folder gives guidelines for protecting soil and plants and improving water use in home gardens. Tells how to build terraces and make plant rows fit natural contours.

Soil surveys

Hitchcock County, Nebraska. By RONALD R. HOPPES, NORMAN W. HUBER, HOWARD E. SAUTTER, AND MAX A. SHER-WOOD. 1970. 50 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Wood and Wirt Counties, West Virginia. By W. J. ELLYSON, R. F. FONNER, AND W. M. KINKLE. 1970. 79 pp., illus.; maps 4 inches to the mile (1:15,840).



Bills calling for a master plan for Virginia's soil survey and the manpower to complete it by 1990 were passed this spring by the state legislature. The General Assembly asked the Virginia Soil and Water Conservation Commission to have a plan ready for action by the 1972 session. A second bill created a scholarship fund for potential soil scientists. Virginia Polytechnic Institute was authorized to establish 20 annual soil science scholarships. Graduates who take jobs in soil science will not be required to reimburse the state.

Evoking wide attention to our threatened biosphere is the aim of Catalyst for Environmental Quality -a spokesman for "the new conservation." The first issue included an article by Dr. LaMont C. Cole, prominent ecologist; a description of Sediment (SCS publication); and an advertisement for a Soil Conservation Society of America scholarship. The quarterly will focus on American aspects of international problems of pollution, population, and planning. Editor is Vivian Fletcher; offices are at 333 E. 46th St., New York, N.Y., 10017.

Connecticut's first sanitary land-fill district has been created by consolidation of solid waste-disposal operations in four towns. Winchester, Barkhamsted, Colebrook, and New Hartford (all within the Litchfield Hills Planning Region in northwestern Connecticut) will share a 60-acre site chosen with the aid of unpublished soil survey field sheets and composite maps. The landfill district is authorized to charge fees, regulate carriers, and prepare its own budget. Onsite availability of

sufficient inexpensive cover material was a primary consideration during final review of 23 potential locations. Had each town developed its own site, two would have been saddled with \$10 per capita operating costs. Favorable cost-sharing arrangements between the state and the district bring the cost down to \$2 per capita in the four towns.

Conservation practices can substantially reduce water pollution by dieldrin and other organo-chlorine insecticides. After analyzing data from the Northeast Appalachian Watershed (Coshocton, Ohio), Agricultural Research Service scientists in Beltsville, Md., concluded that conservation practices could prevent pesticide transport either in runoff or on eroded soil particles. Results showed that dieldrin leaving fields in runoff was less than 0.03 percent of the amount applied even when conditions favoring surface water movement were created.

Abandoned railroads can become roads to adventure, leisure, and nature. After tracks are taken up, the long, wide, well-drained roadbeds required by trains make ideal trails for riders, cyclists, and hikers. So says a multiscreen slide presentation put together by the Department of Park Administration of Texas Tech University. Replanting may be necessary in spots, but native vegetation usually abounds along railrights-of-way. Frequently, grade is gentle enough for people of all ages and degrees of agility. Historic sites and picnic areas might be included in plans for development. The slide talk makes a case for public acquisition and development of this unusual reworkable resource.

Some wild—but not unruly—neighbors will be invited to move into an Illinois subdivision. Plans prepared for a Will County developer include natural areas on each

lot line. Strips of grass and shrubs 20 to 40 feet wide will be left between homes to provide potential wildlife cover.

In Manitoba, Canada, inspectors enforcing the Clean Environment Act need no warrant to enter any building, other than a dwelling, to investigate possible sources of contamination. They provide front-line muscle for the province's "watchdog over pollution," the Clean Environment Commission. The commission assesses probable impact of soil, water and air pollution, sets limits and standards for treatment and disposal of wastes, and grants licenses for discharge of wastes into the environment.

Windbreaks of corn helped soybean plants grow taller, produce more dry matter and larger leaves, and retain more water in recent Agricultural Research Service tests at Morris, Minn. The 2-row "cornbreaks," planted across the prevailing southwesterly winds, boosted soybean yields as much as 6 bushels an acre.

Quality fishing?

In promoting quality fishing there is the inevitable question: What is quality? We believe quality has three basic dimensions: the aquatic environment (the fishery), the shoreline environment (water-influence zone), and the spatial distribution (angler density) . . . The dimension of space directly influences the quality of the experience regardless of other factors. So the final chapter in the maintenance of quality fishing will be the disposition of angling pressure—people management.—LLOYD M. ANDREWS AND THOMAS J. BOARIO, biologists, Wisconsin Department of Natural Resources,

Data on roadside erosion in Wisconsin (Soil Conservation, Sept. 1969) have been summarized by the Extension Department of the University of Wisconsin in a publication, Erosion on Wisconsin Roadsides. It is available from the Wisconsin Chapter, Soil Conservation Society of America, P. O. Box 5155, Madison, Wis. 53705.

From the Administrator:

From teach-in to teaching

This year seems likely to go down in history as the one in which "ecology" moved out into the popular vocabulary, literally shoved into the limelight through the momentum sparked by the April 22 "Earth Day" teach-in's and the growing environmental concern among students.

What was not said often enough or clearly enough during the verbal deluge which preceded Earth Day is that conservation is ecology in action; conservation practices have always been, for the most part, based on applied ecology.

It is still too early to make any assessment of lasting results from the nationwide educational thrust of April 22, but one trend already surfacing indicates that a growing number of colleges and universities are gearing up for at least one course designed to give students a look at man's relationship to his environment.

But to expect a one-semester college survey of environmental problems to compensate for years of lost opportunities with students in secondary and elementary schools in developing an understanding of conservation principles is totally unrealistic.

The need for conservation education as a part of the school curriculum, kindergarten through high school, becomes more imperative each year, particularly in view of the growing complexity of environmental and conservation decisions facing these students as adult citizens.

The Soil Conservation Service, together with other resource agencies and organizations, stands ready to offer technical services and ecologically sound information which can help teachers and school administrators inaugurate and develop conservation studies within established curricula.

What we, as professional conservationists, have to offer is not a curriculum package with all the corners neatly tucked in. We do not need even to know all the answers to all the questions—there are still discoveries

ahead for the child to ponder. What we sometimes forget is that many of the details of resource relationships which we have come to take for granted through years of familiarity are fresh new wonders for the student. The sensitivity and enthusiasm with which we meet his questions will enter into his attitudes and his personal response to the broad ecological base upon which resource use and management rests and will be absorbed into the texture of his understanding of his own place as a steward of environmental quality for himself and for others.

Local schools traditionally have reflected the social, cultural, and economic philosophy of the community, and this is not likely to change soon—nor should it. Most local school boards are made up of conscientious citizens who do their utmost to bring the best educational opportunities to the children of the community.

In this context, soil and water conservation district leaders, equally aware of the needs of their own communities, have probably the greatest opportunity of any single group to work toward a conservation education program within every state.

If the ecological and environmental questions raised by the Earth Day teach-in's do nothing more than stimulate a public awareness of the importance of conservation understanding and concepts as a fundamental part of education, much will have been accomplished.

A recent article in The American Biology Teacher magazine quoted Dr. William Stapp of the University of Michigan, a leader in environmental education: "Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution . . . Natural resources serve man in many ways, whether in a relatively undisturbed condition or in the highly altered utilitarian forms."

This pretty well sums up what both teach-in's and teaching are all about.

Kenneth E. Grant

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Planting to keep a bay beautiful

Ordinarily little Kawela Bay on the north shore of Oahu, Hawaii, is noted for its calm, azure water, but heavy storms turn the picturesque bay into a churning mudpot. High seas and runoff stir up and add to a foot of sediment that carpets the bay floor.

Before this century, slight geological erosion was the bay's only significant source of sediment in a drainage area that includes the Koolau mountain range. Trouble started in 1920 when the pineapple industry placed a large acreage under cultivation. Erosion increased because early pineapple growers thought they should plant up and down slopes for proper drainage.

In the early 1930's, cattle were pastured on part of the pineapple acreage. Their trails etched eroding scars on the slopes.

Since the 1940's, the area has been used for troop and mechanized jungle cavalry training. Men digging foxholes, building roads, and operating tanks have added to the load of silt bound for the bottom of the bay.

One hundred acres of sugarcane planted in 1963 replaced the last pineapple field. But newly planted canefields also were subject to damage during storms.



Thick-growing pangolagrass protects a gully's face above Hawaii's Kawela Bay.

Efforts to control erosion were begun in 1965 by trustees of the Campbell Estate, which owns the watershed. A request for Soil Conservation Service help came through the Windward Oahu Soil and Water Conservation District.

Two thousand pines were planted in the fall of 1965 for future harvest. Another 5,000 were planted a year later. Trial plantings of grasses also were made during the 1966 experiment with material furnished by the SCS Hawaii Plant Materials Center.

Studies showed pangolagrass provided the most rapid and complete

cover on severely eroded sites. Therefore, more than 100 acres have been planted in pangola since original trading. Fertilizer is applied to increase grass growth and vigor.

In addition to these vegetative measure, studying the possibility of a sediment-retention dam is being considered.

SCS specialists say that the successful Koolau Range plantings could prove helpful in solving similar problems and in roadside beautification and erosion control during housing development.—MAX S. CORAY, district conservationist, SCS, Honolulu, Hawaii.





Planning for a better environment

© conservation

Changing uses ...

Conservation steps toward improving the world around us sometimes go unchronicled. This issue of **Soil Conservation** Magazine contains a selection of reports and notes with a more-than-ordinary application of man's widening effort to make his world more livable and his future more secure.

The discussion by Under Secretary J. Phil Campbell of the U.S. Department of Agriculture (p. 27), of the importance of resource conservation now in designing the America of the future, was drawn from a talk the author gave as a part of the Department's Earth Day observance. It underscores the urgent need for careful decisions in this decade as to the changing uses of our already burdened natural resources.

The change of an orchard enterprise near a rapidly expanding urban community is typical of problems confronting many a farmer in these United States. The decision by the Samuel Pattersons (p. 36) to add a golf course to their farming represents the way a growing number of landowners are coping with economic pressures.

Dust for a generation has been a declining problem in the Great Plains, thanks to the combined eforts of landowners and the forces of conservation. A change in cropping sometimes is the solution. The Big Spring State Hospital in Texas' Southern Plains (p. 30) found that control of blowing dust had a marked effect on the condition of its hundreds of patients.

COVER: No Johnny-come-lately to environmental planning, America's conservation farmers have done it for years. Here, a Pensylvania farm in contour strips of oats and corn. 27 A crucial task for mankind By J. Phil Campbell

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

CLIFFORD M. HARDIN, Secretary of Agriculture KENNETH E. GRANT, Administrator, Soil Conservation Service BEN O. OSBORN, Editor GEORGIE A. KELLER, Production Editor

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In spite of our rapid technological advances as a Nation, some of the important things we need to know about environmental interaction have escaped us. To complicate matters, each of us has his own approach to solving environmental problems—making it a challenge to arrive at rational conclusions on virtually anything.

Gradually we are learning about the highly complex interdependency that exists among all living things and the environment . . . that environments manage men even as men manage environments.

We can all agree on one point: Man is the dominant species, and the use of nature to further his own well-being is correct.

People-problems

What, then, is the problem? A part of it is the outgrowth of human impaction—urban congestion and the related problems of squalor and crime.

The birth of each new American—at the rate now of one every $7\frac{1}{2}$ seconds—means that in his expected 70 years of life he will use 26 million tons of water, 21,000 gallons of gasoline, 10,000 pounds of meat, 14 tons of milk and cream, 9,000 pounds of wheat, and great quantities of other products from the earth.

Multiply those figures by the estimated population growth in the United States of an additional 100 million by the end of the century. Throw in the expected dependence of other peoples of the world on certain of our raw materials. At this point I think it becomes abundantly clear that management of the environment is, for mankind, a crucial task.

Nature as enemy

Realization of what we must do to manage our environment is more difficult because of our heritage. From the landing of the Pilgrims through the next 200 years nature was the "enemy." The settlers appreciated the beauty of the wilderness, but their every effort was

A crucial task for mankind

By J. Phil Campbell
Under Secretary of Agriculture

needed to survive in a hostile environment.

Land neglected

They won the struggle for survival, and agriculture developed into a technology characterized by an attitude of exploitation and harvest. It was a technology careless of the land and the forests, extracting more than it replaced. There was always another frontier, a new field, meadow, or forest. The bounty of the land seemed limitless.

The technological development of industries and cities—made possible by agricultural advances—moved ahead under a competitive economy. This economy dictated that an investment show an immediate profit. Waste management was accomplished at minimum cost. Free disposal in air or water was used as much as possible.

In retrospect, it is not easy to say this was right or wrong. The foresight to avoid the deterioration now visible and the willingness to forego immediate profits might have materially slowed industrialization and the growth of the United States. One thing is certain. To the extent that the quality of our environment must be restored, we are paying bills incurred long ago.

Without man's stewardship, Nature itself has rarely been productive enough to meet man's needs—certainly not in the numbers in which we exist today and will exist in the future. Yet our resources must serve every economic and social need of mankind. The challenge is to assure that beauty and bounty as well as conservation, development, and use are maximized simultaneously into the very long future

Record of action

At this point it is probably well to remind ourselves of something too easily forgotten in the present rising tide of public concern with environmental quality. The environmental issue is not a new one. Fifty years ago and more, men were fighting for acceptance of the concept that soil, water, wildlife, forests, and waterpower were renewable resources which might last forever if they were treated and harvested sci-

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entifically, instead of being consumed faster than they were reproduced.

Those men made some impact: men like Hugh Hammond Bennett, first chief of the Soil Conservation Service; Gifford Pinchot, who persuaded the government that conservation was a management tool; and John Muir, whose longtime dream was fulfilled in the establishment of the National Park System.

Landowners cooperating

Agriculture paid some heed; and while the work is far from complete, the record is noteworthy since the Dust Bowl days of the 1930's. By last July, more than 2 million individual farmers, ranchers, communities, and other land users were under voluntarily signed cooperative agreements to put conservation plans into effect. The land involved runs to three quarters of a billion acres—all in conservation programs.

In 1969, the Great Plains Conservation Program was extended for another 10 years. Its provisions were broadened to do a better job in pollution control, fish and wild-life improvement, and in recreation.

Since January of 1969, more than 130 small watershed projects have been approved for Department help—nearly one-seventh of all the projects approved in the 15-year history of the program.

Already this year we have approved USDA planning help to 12 new Resource Conservation and Development projects, for a total of 68 now underway. Most of these projects include accelerated soil and water conservation, development of water resources, social and economic development.

Many DDT uses were cancelled, and we intend to phase out other nonessential uses by the end of 1970. We will be taking similar action toward other pesticides that persist in the environment or endanger human health. Increased research is being applied to the biological control of pests, offering considerable long-term promise in

reducing the need for chemical con-

However noteworthy the record may be, it serves to underscore the need for ever greater action. For example, much remains to be done in the field of waste disposal—animal wastes, wastes from processing of raw agricultural products, plant nutrients, forest and crop residues, inorganic salts and minerals, and certain forms of air pollution. Moreover, many other wastes not originating in agriculture and forestry do great damage to crops, trees, and the landscape. Numerous wastes in both solid and liquid form must be disposed of in rural areas.

The only receptacles into which we can dump our wastes are, so far as we know, the air, the water, and the soil. The painful truth is that relatively little is known about the capacity of each to assimilate pollutants without being irreversibly damaged.

Siltation

Undoubtedly the greatest pollutant of all—and the one least visible to the public eye unless one takes time to look at the Potomac River running red these days—is siltation. Most people think about sediment in relation to erosion and floods on farm, forests, and rangeland. They rarely consider that great amounts of sediment are produced in leveling the land for homes, shopping centers, factories, airports, and warehouses.

The whole urbanization process has become an increasingly trouble-some environmental problem and not from the standpoint of sedimentation alone. A study by the American Institute of Planners revealed that land is being urbanized at the rate of 3,000 acres a day.

We are not so much concerned with running out of land as with running short of land for particular uses. Even with a continued rise in total population one-half of the counties in the United States are losing population. A reversal of this trend is not only desirable. It is essential.

There are sound reasons for the orderly development of less densely populated areas. We have the space and we have the ability. Science, technology, and the ingenuity of the American farmers with the help of public agencies, private institutions, and industries serving agriculture have gone a long way toward making this possible.

We continue to produce more and more on fewer and fewer acres in this country. Today less than 50 percent of the Nation's total land area is in farms. Less than 20 percent is classified as cropland. Less than 3 percent of our total land area is in urban and related intensive uses. Thanks to a highly developed agriculture, this country has ample land for other purposes.

There is room for more people to have homes, industries, shopping centers, and cultural institutions in the open country.

Rural and community development, now and in the future, presents an important frontier of environmental development, one with which the Department has been deeply concerned.

High priorities

With our current know-how plus our ability to extend our research further into the mysteries of natural phenomena, we can accomplish nearly anything we wish if we set high enough priorities. But costs are involved, and costs for environmental improvements have to be equated with costs of other desirable goals of the American public.

The will of the people will prevail. We are seeing evidences of that will being exercised all across the country, particularly among young people. It is a promising sign. To make meaningful decisions, however, people must be well informed. They must be presented with a sound, systematic body of data that will replace visceral reactions with logical actions. This objective education is as critical a need today as the technology of environmental science and management. •

New plant clears water and the air

Clean, clear water flows now in Caney Creek below the new waste-treatment plant in the northeastern Oklahoma town of Stilwell.

Tests show the water has even less impurity than the water in the stream above the plant, a stretch of water that had been considered to be of unusually good quality.

The citizens of Stilwell no longer complain about the strong odor from the waste from a canning plant, the largest commercial employer in Adair County and processor of locally produced fruit and vegetables.

And fish no longer die in the once heavily polluted stretch of the creek below the plant.

Solving the critical pollution problem was the outgrowth of a determined effort by groups united in the Cherokee Hills Resource Conservation and Development Project.

Until nearly a decade ago the principal problem in the community appeared to be lack of enough water.

The company wanted to expand, a move eagerly sought by community leaders. New jobs were needed.

The Sallisaw Creek Watershed Project was the answer to the water-supply problem. The work plan prepared by project sponsors in 1961 with help from the Soil Conservation Service provided for two municipal reservoirs—one for Stilwell and one for Sallisaw, a town at the lower end of the watershed.

Loans through the Farmers Home Administration and a grant from the Economic Development Administration enabled Stilwell to obtain 3,000 acre-feet of water from the new reservoir later named Lake Carson. Employment by the can-



Gene Stephens, manager of Stilwell's new sewage-treatment plant, uses instruments to check system's efficiency.

ning plant went up as more fruit and vegetables were processed.

Most of the solids being treated in the waste from the plant were potato peelings, green bean tips, wilted or damaged greens, strawberry caps, and okra ends. The city sewage-treatment plant unsuccessfully tried acid to break down solids before pumping the waste into sewage lagoons.

The city then tried pumping waste into holding basins, and an orchard company began using it for irrigation. The volume of solid waste required the high rates of nitrogen to break down the organic matter. The combination of organic matter and nitrogen resulted in excessive vegetative growth in the orchards rather than in fruit production.

The undesirable odor drew vigorous citizen complaints, and fish kill was reported as far as 5 miles below the treatment plant. Action to solve the difficult problem was initiated in the RC&D Project. The Oklahoma Development Foundation was asked to help, and Dr. Seward Robb and specialists from the University of Oklahoma began a study. Their goal was an economical unit that would effectively break down solid waste and yield unpolluted water.

The study team recommended a new sewage facility. Stilwell voters approved an \$88,000 bond issue to match an Economic Development Administration grant to build it.

The new plant is performing its function well, as tests are proving. Fish are seen in the stream even where the flow from the treatment plant comes in. And Stilwell residents no longer have need to complain about the air they breathe.—Gary L. Bullard, biologist, SCS, Cherokee Hills RC&D Project, Tahlequah, Okla.

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Healthier, happier patients...



District Conservationist Gerald Miller, left, and Dr. Preston Harrison, superintendent of the Big Spring State Hospital, admire a group of sunflower plants—part of the range seeding mixture on the hospital grounds.

Outside, the wind howled in fury, lunging at the building and straining at every window. Clouds of heavy brown dust rolled by, leaving in every room of the big hospital the soft, choking haze that attends every duststorm.

Patients in the State Hospital at Big Spring, Tex., shuddered. Some covered their heads with the bed clothing.

"It was especially bad in spring and fall," Dr. Preston Harrison, psychiatrist and superintendent of the 1,000-bed mental hospital, recalled. "I can't tell you how upsetting the blowing sand was to our patients."

The picture has changed, Dr. Harrison reports, since conservation practices were applied. He gives much credit to Gerald Miller, district conservationist for the Soil Conservation Service at Big Spring, and to Delbert Stanley, who holds the lease on the hospital's 400 acres

Grass cover solves hospital's dust problem

of cottonland that curves around the buildings to north, west, and south.

Cotton, clean-tilled and harvested in the early fall, leaves the land with only sparse stalks of the crop for protection against soil blowing.

The hard winds of spring and fall blow from west or north, picking up dust and grit from the inadequately protected land and hurling them toward the hospital.

Stanley, with technical help from Miller, worked out a conservation farm plan for the hospital land in 1968. It called for changing the cropland to grass under a 5-year Great Plains Conservation Program contract.

Miller suggested a crop of redtop cane for soil cover the first year, the residue from the crop to be left on the soil's surface as a mulch. Miller explained the crop residue would reduce blowing of the soil through the second year and would conserve moisture, a vital need for seeding grass where annual rainfall averages only 18 inches.

The grass, planted in 1969, now is sufficiently established to protect the soil. In spring 1970 there was little dust from the hospital land.

Dr. Harrison reports the change has produced a marked improvement in patient care at the hospital.

"The patients are healthier, happier, and easier to care for," he said. "Blowing sand seems to have a marked effect on patients such as ours. It makes them extremely restless. It affects their moods, making them depressed and agitated. They

can't sleep and, as a result, it takes more tranquilization and more care to offset the effect of the duststorms."

The superintendent emphasized that the electrical charge in the air during a duststorm adversely affects the mentally disturbed. The more dust in the air, the worse the static electricity, he explained. It is this atmospheric condition which is so upsetting to the patients.

"And when the wind blows, the sand covers floors, halls, and equipment with fine grit," he continued. "Sometimes when the patients would get up in the morning, the only clean place in the building would be that part of the bed where they had slept. You'd walk across a room or open a window and it would grate and grind, enough to get on anyone's nerves. The sand dunes would pile up outside, blocking walks. We couldn't get the patients to take the daily walks essential to their treatment."

Dr. Harrison said that a patient who is already depressed becomes more so during a duststorm.

"They would simply give up all hope," he explained. "Their only recourse would be to withdraw from reality. We have had patients making good progress who would suffer severe setbacks during a dust-storm."

The hospital staff has observed, too, that since the presence of dust has been reduced there have been fewer respiratory ailments among patients.

Business Manager L. K. Miller, who is not related to the SCS conservationist, was pleased with the conservation work for other reasons.

"We were spending too much money repairing damage caused by the dust," he said. "The last year that land was in cotton it cost us nearly \$1,300 to replace electric motors that burned out after one storm. One year we spent \$800 to clean the dunes off the lawn, and the next year we paid \$1,000 to clean the dunes away again."

Miller remembers it was the same almost every year—replacing bearings in fans and ventilators, trying to keep brakes operating properly in hospital vehicles and the like.

"You can imagine how low our morale sank when we had to go without ice or laundry and the other things electricity helps provide us," he said. "But you know, we haven't had a bit of trouble from sand with

any of our equipment since we put that land in grass."

It was the SCS man, Miller, who suggested planting a little sunflower seed with the grass. The seed from plants is relished by birds, especially dove and quail. Surely, he reasoned, the sight of wildlife would be appealing to the patients.

Business Manager Miller looks with favor on expanding the idea. When Stanley's lease expires, the hospital will consider further wildlife improvements, even to the point of turning the entire farm into a wildlife sanctuary.

Dr. Harrison summed up the entire conservation program of the hospital this way: "We have a vastly improved hospital environment—a better place for our patients to live and get the treatment they are here for."—Dale D. Allen, information officer, SCS, Temple, Tex.

Delbert Stanley shreds weeds off a lovegrass planting on hospital land formerly cropped.



New beach adds

Clayton Barkley, a cooperator with the Washington County Soil and Water Conservation District in New York, dropped into the Soil Conservation Service office in Fort Edward one morning to see about building a beach.

No longer able to do heavy farmwork because of his advancing years, Barkley had built three cottages around his small fishing lake to help with income.

He soon observed that among the family groups renting the cottages not everyone wanted to fish, but almost everyone wanted to swim. Swimming in Barkley's lake meant swimming from a boat which was not ideal for children. This was why cottages were not always rented for the full season. Therefore, Barkley wanted to ask about a beach.

The district conservationist was able to help Barkley choose a place for the beach. Barkley then changed his conservation farm plan to provide for the needed work.

Soon a contractor was grading the beach area and a small parking lot. Muck was removed from the pond's shore and gravel placed there for a base. A heavy layer of sand followed. Tile drains were installed to control the flow from a spring, and a diversion was built to eliminate surface water.

In the winter Barkley circulated a new brochure describing the beach. He had all his cottages rented for the entire season. This led him to build two new cottages.

Increased business enabled Barkley's daughter and her husband to move back to the area to help with the expanded enterprise.

Residents of nearby areas are among those using the beach now, Barkley reports. It pleases him to know that his efforts have produced something the whole community can enjoy.—STANLEY M. ANDERSON, district conservationist, SCS, Fort Edward, N.Y.

Sailboaters enjoy the water at Four Lakes Apartments, Lisle, III. Many trees were retained when this old gravel pit was developed for apartments.

Wes Tonyan enjoys fishing his lake, a former gravel pit, which he will develop into a subdivision.



Gravel pit today, subdivision tomorrow

By Richard L. Duesterhaus
Resource conservationist, SCS, Lisle, III.

Wes Tonyan of McHenry, Ill., mines gravel for a living. He also builds lakes. In the urbanizing Chicagoland market, gravel and lakes are in strong demand. Tonyan stands to profit from each. Best of all, the two enterprises are parts of the same operation.

One of the former gravel pits is now a beautiful 25-acre lake. Another pit is being carefully shaped as gravel is removed. When Tonyan retires from the gravel supply business a few years hence, he expects to subdivide the area around both lakes. He will have charge of some pretty valuable real estate.

This example of orderly development of land underlain with minerals—from pits to lakes to subdivisions—reveals the shape of things to come. With zoning ordinances getting tougher and with all the talk about eyesores, blighted areas, and wasted resources, developers are finding it economically possible and prudent to find ways to replace blight with beauty.

In Tonyan's case, it's a matter of stockpiling topsoil, shaping the steep banks of the pit as mining progresses, and then replacing the topsoil to produce a fertile seedbed for soil stabilizing grasses. He also plants trees and shrubs for beautification. The water level in the pits is maintained by the surrounding high water table.

Tonyan believes zoning officials should encourage good use of

gravel pits which, in his case, resulted in dozens of premium lakeside lots. He considers this is better than restriction.

"This land would be virtually worthless if we hadn't planned and carried out the development of this site," he asserted.

A second example of gravel pit development is the "Four Lakes" apartment complex at Lisle, Ill. The developer molded a parcel of unsightly land—a mined-out gravel pit—into an attractive community of 500 apartments. An adjacent tract has been purchased for expansion of the gravel-pit lakes and construction of another 500 apartment units.

Neighbors of the community like the esthetic improvement. Most of the existing trees were retained, the lake shorelines stabilized, and apartments located so that each would present a view of the lakes. The results have been rewarding—virtually no vacancies.

Spoil from the gravel pits has been spread on the adjoining slope to create a ski and winter sports area.

In DuPage County, west of Chicago, county authorities are cooperating with the Forest Preserve District to use an old gravel pit for garbage disposal and at the same time build a public recreation area. A 1,000-foot-long ski trail will be developed on this sanitary landfill site. The DuPage County Forest Preserve District owns the land and is providing facilities for tobogganing, other winter sports, boating, canoeing, and fishing. The site was sealed to avoid pollution of the ground water.

The ideal procedure in such projects is to plan the project before mining any of the gravel or other minerals. This provides for the least moving of spoil. A plan showing the proposed use of the land related to the natural resources

is also becoming a requirement with many local zoning officials.

Illinois soil and water conservation districts are working with developers to explore resource-use opportunities. Soil Conservation Service conservationists provide planting and seeding information. Soil maps of these areas before mining help identify the layers (horizons) of the soil profile to stockpile for later topdressing. They also identify those soil horizons not likely to support vegetation.

Conservation practices usually installed on these projects include lake construction, shoreline stabilization, critical area seeding, tree planting, diversions, pond management, and occasionally, such practices as silt basins and grassed waterways.

Practices and planning go together in Illinois to assure both harvest and protection of natural resources.

Hundreds of residents enjoy the ski-slope at Four Lakes.





Watershed action ...

STEPPING STONES to community progress

By David S. Farmer
District conservationist, SCS, Farmville, Va.



They had lost good crops year after year. The bottom land had been flooded too often and left covered with sterile silt. Mud and debris filled the stream channel.

The long-suffering farmers along Buffalo Creek in Prince Edward County, Va., decided to act. Today, their land is protected from flooding, the town of Farmville has a much-needed reserve water supply, and the county soon will have an excellent fishing lake.

The transformation began 10 years ago with the Buffalo Creek Small Watershed Project under Public Law 566. The 74,700-acre project, with the Soil Conservation Service assisting the Piedmont Soil and Water Conservation District, included nine floodwater-retarding dams, 26 miles of channel improvement, and 86 miles of roadbank seeding. Forestry management and conservation practices to protect the land also were in the plan.

All structural improvements for the \$1,557,579 watershed project have been completed except for 12 miles of channel work.

Primary aim of the project was to protect agricultural land against flooding, but benefits to the nonfarm people of Prince Edward County and the town of Farmville are worth many thousands of dollars. The nine structures now store 350 million gallons of water to give the community an excellent reserve supply.

Dependable water supply helped the Farmville Area Development Corporation to attract two new industries to the Farmville Industrial Park within the last 5 years. The new industries now employ about 1,200 people. Several existing in-

SCS specialists check operation of principal spillway on recreation lake.

dustries have expanded, and Farmville's Longwood College now is completing two new high-rise dormitories that will house 1,000 additional students.

The Buffalo Creek Project gave the people of Prince Edward County an insight into the benefits of good water-resource planning. As a result, landowners, county and town officials, and other interested citizens recently organized the Bush River Watershed Association.

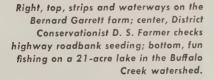
Immediately after its organization, work was begun on two multipurpose structures that will provide facilities for recreation or additional municipal water.

The Virginia Commission of Game and Inland Fisheries is now working with the Piedmont District and SCS to provide for an 814-acre lake on Briery Creek that will be used for both recreation and flood prevention.

Briery Creek Lake will be used for fishing and boating. It will be fertilized at a rate that should provide an annual fish catch of 200 pounds an acre. Picnic areas and campsites are planned, and other kinds of recreation will be developed.

At a recent meeting of the Prince Edward County Board of Supervisors, SCS and the Piedmont District were asked to plan a site on Sandy River as a multi-purpose structure. The preliminary plan calls for a 510-acre lake which would store 5,000 acre-feet of water for use by residents of the county.

You might say the Buffalo Creek Project pointed the way. The residents of the Bush River watershed, aware of the resource potential and the needs of their area, are taking the cue. •









It was change or sell ...

Golfers and apples keep family on farm

The farm of Samuel A. Patterson near Cleveland, Ohio, offers a choice—fruit from the Patterson orchard or a round on the 18-hole golf course.

Either contributes to the family's income.

The combination has kept the 400 Patterson acres intact in spite of the mounting pressures of taxes and developers in the Cleveland suburbs.

Patterson made an important decision when his father retired, leaving the farm's operation to him. Costs were rocketing. Patterson sought out the best agricultural information available, including new land-management methods recommended by the Geauga Soil and Water Conservation District and the Soil Conservation Service.

The choice was clear: Change or sell. There were six members of the family to support.

"The crowding I had seen on golf courses suddenly clicked in my mind," Patterson recalled. "I began to investigate that source of income."

When Patterson and his two older sons, Tom and Jim, decided to lay out a golf course. SCS conservationists checked soils' information, drainage patterns, and erosion factors. A poorly drained pasture below a rock outcropping near the Patterson's main fruit-processing shed was selected for the first tee of a nine-hole layout. To make this area usable, SCS designed a tiledrainage system to carry subsurface water away from the field. A 100yard-long diversion along the upper part of the slope shunts other excess water into a main ditch.

Along the edge of a fairway the Pattersons found a site for an irrigation pond. The SCS soil map indicated suitable waterholding land in that area, and the gentle slope provided a watershed. The site was easily shaped to serve as a water hazard.

The plan called for one of the main orchards to form a border for two holes. Here the fairways dogleg around the fruit trees. In a few places golfers follow paths through the orchard from green to tee.







Patterson fruit farm building, left, adjoins the golf course. Golfers are among the farm's best customers. Above, the Samuel A. Pattersons and son, Tom. Far right, SCS Conservationist Nathaniel Wilder and Samuel Patterson check the grass at the 10th green.



Looking out over the first tee, golfers and conservationists—can also note the pond and apple orchard in the background.

With the nine-hole course in place and suitable grass cover protecting the new greens, tees, and fairways, Patterson's Orchard Hills Golf and Country Club was opened for business.

In less than a year, business was humming. The Pattersons began planning a nine-hole addition.

Again, SCS helped the family revise the conservation plan to fit the new layout. Fairways were shaped and seeded. More tile was installed, bringing the length of all the tile lines to almost 4 miles. Surface ditches and diversions completed the improved drainage system.

Two new SCS-designed ponds became part of the Orchard Hills course. One pond, covering 1½ acres, more than doubled irrigation water supplied by the original pond. An underground system carries water from the two irrigation ponds to most of the course. The third pond, near the 16th fairway, is a water hazard and an emergency water supply.

With 18 holes completed, the Pattersons mobilized their family talent. Jim, the oldest of the four

children and an Ohio State University graduate agronomist, took charge of the orchard. His brother, Tom, took on the management of the golf course. Mary Lou, an Ohio State student, helped her mother with bookkeeping and apple store sales. Jack, a high school student, pitched in wherever needed. He also shows signs of becoming the family golf pro.

"It was easier to coordinate the operation of the golf course and the orchard than we expected," Patterson said. "One operation overlaps the other as seasons change. This keeps our help and equipment productive most of the time."

In early spring, the Pattersons tap a 30-acre sugar bush bordering the course. This yields an average of 300 gallons of maple sirup each season. It is sold at the Patterson farm market along with an annual 15,000 gallons of apple cider and 12,000 bushels of apples.

"One unexpected sales angle comes directly from the golf course," Sam Patterson said. "Golfers walking through the orchards often pick up an apple to eat along the way. That whets their appetite, and they often stop to buy a basket as they head for home. We find that our 55,000 rounds of golf a year sell a lot of apples."

The community shares benefits of the Patterson's farm-recreation operation. The Pattersons hire at least six men full time. Others are hired during the apple harvest season and again during the summer when the course needs attention. In busy seasons, 15 to 20 people are usually on the Patterson payroll.

Though the golf course has become the more profitable part of the family's dual enterprise, Patterson is still expanding his orchard. He planted 100 new peach trees this past year. Other plantings are scheduled.

"Golf and orchard farming give us a cash income for the entire year," Patterson said. "But the real benefit is that our whole family can stay on the farm with enough income for all."—GORDON S. SMITH, information specialist, SCS, Upper Darby, Pa. •



Soils map points way to grassland enterprise

By Waldo Rodene and Ray Kubie
District conservationist, SCS, Pawnee City, Nebr., and area conservationist, SCS, Lincoln, Nebr.

T om Bodie sells grass "on the hoof." The Liberty, Nebr., cattle raiser says he is really a grassland farmer. His cattle harvest the crop. Bodie buys 350-pound calves and puts them on the grass. He markets them at about 850 pounds. His goal is 100 pounds of beef an acre a year.

When Bodie came back from World War II he bought 400 acres of cultivated land that was, in his words, "sand burs, sunflowers, cockleburs, and every other kind of weed that grows, and the land generally was in a thoroughly depleted state of fertility." City-born and inexperienced at farming, he sought help from the Pawnee County Soil and Water Conservation District. A map of his soils showed his land better suited to grass than to cultivation.

Bodie learned the soils on his farm absorb water slowly, and therefore the runoff rate often was high during intense rains. "The result is high soil loss unless the land is protected," he explained. He followed the recommendations of the Soil Conservation Service for proper land use.

He converted whole fields to native warm-season and cool-season grasses. He built terraces and seeded grassed waterways on remaining cropland to protect the land from further deterioration. He built more than 5 miles of terraces, 17 acres of grassed waterways, and four livestock water dams. All of his rougher land has been put in grass. He retained enough cultivated land to raise a grain supplement for the cattle.

The drought of 1956 showed Bodie that native warm-season species were superior to the cool-season ones for hay and range. His program now includes about 75 percent warm-season grasses and the rest in cool-season grasses like bromegrass, orchardgrass, Reed canarygrass, and fescue. He seeded more

than 1,200 acres to native warmseason grasses. He also has some alfalfa.

Conservation management of land and grass is Bodie's key. In converting from row crops to grass, he planted grain sorghum the first 2 years to help in weed control and to provide residue in which to seed the grass. His seedings were either in late fall or early spring.

For the first 5 years the grasses are used for hay because of higher yields during that period. Yet cutting hay removes plant nutrients and causes moisture loss, so production begins to drop. The next 5 years Bodie follows a grazing program based on "take half, leave half" of the production of his key plants. This rule helps to restore moisture and increase growth.

Pastures to be grazed in the winter are selected in advance on the Bodie ranch. Proximity to the farmstead and available water are factors. Bodie doesn't use these wintering areas during the summer, although when rainfall is ample they may be mowed in midsummer, and the bales left in the field. Mowing in this case helps late summer and fall growth.

Bodie feeds grain supplement

At right, Rancher Bodie feeds corn supplement to his animals in winter but relies primarily on grass. At market time the big trucks, left, park for loading in thigh-high grass.





during winter months and practices preventive medicine. He believes cattle are actually healthier when not confined to lots in winter. It eliminates the need for yards and shelter, and manure is scattered on the land—thus controlling pollution and applying sanitation at little cost.

Roundup time is reasonably simple. Bodie has a portable corral and portable loading chute that set upright on the grass where the cattle are. Trucks follow, and when the cattle are loaded the pens knock down and load into the portable chute. Pickups that bring out the riding horses to work the cattle also pull the loading chute with the portable corral.

Over the years Bodie has had to expand in order to use labor efficiently. The operation now covers about 2,000 acres. Most of the land joins, a help in management.

"You can't afford to maintain fences, provide water, and care for cattle in smaller than 160-acre enclosures, particularly if they are some distance from the farmstead," he explained.

Having analyzed soil, climate, labor, and other factors, and applied good management, Bodie has put together a combination that probably will soon reach his goal: 100 pounds of beef an acre, all from grass. ◆

Educational Film

An educational film for those curious about ecology has been released by Coronet Films. Although it is recommended for junior and senior high students, "Plant-Animal Communities: Ecological Succession" may help adults deal with some of the confusing terms used—and misused—in so many of the conversations and publications inspired by recent events. The film is to show the predictable patterns of plant and animal succession from bare rock or water to climax communities.

Tile-drainage system improves grove

The first tile-drainage system for citrus, in the Brevard Soil Conservation District, which is located in the heart of the famous Indian River citrus area of Florida, was on Earl Peppercorn's grove. Peppercorn applied to Brevard District 3 years ago for technical help in solving severe water problems affecting his mature citrus grove. The grove was planted on soils with high water tables, and practically all the tree roots were located in the top 12 inches of soil.

Small, inadequate ditches had been dug by hand to remove surface water. These ditches, about 2 feet wide and 2 feet deep, surrounded most of the trees. Tree limbs, leaves, and fallen fruit filled the ditches and caused surface water to stand for 2 to 3 months of the year.

Only hand labor could be used for fertilizing, mowing, pruning, spraying, and harvesting. This hand labor increased costs while yields remained constant.

Studies showed that a tile-drainage system would be the best

method for water control. A tile plan was developed by Soil Conservation Service specialists. Peppercorn promptly made arrangements for installing the system which called for 5,570 feet of clay tile.

The system was put in with the guidance of the specialists and in accordance with SCS standards. Each line was installed to a designed grade and averages 3½ to 4 feet below ground level. A graduated gravel filtering material was placed around the tile to prevent sand from entering the system. The outlet was stabilized with solid pipe, a concrete floor, and sand bags on the ditchbanks.

The outlet pipe immediately began discharging excess water.

Peppercorn began filling in the small ditches with excavated soil from adjoining highland and using mechanical equipment for fertilizing, spraying, pruning, and harvesting. He reports his trees are healthy, and production costs are lower. And no longer is there standing water in the grove.—Benjamin E. Wiggins, district conservationist, SCS, Cocoa, Fla.

A clay tile line being installed, exposing shallow roots of 40-year old grapefruit trees planted on high water table soils.



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Better range and cleaner air

California

In California's Northern Sacramento Valley, Sam Ayers of Red Bluff is converting his brush-infested hill land to improved range without the air and water pollution often resulting from such action.

Hundreds of thousands of acres of marginal range in the northern California area are undergoing improvement through removal of the thick oak and brush to permit growth of more productive and palatable grasses.

In the past, many ranchers have been bulldozing the brush, letting it dry for about 2 years and then burning the woody material along with the grass residue. The smoke rides the air currents for many miles.

When winter rains come, the ash residue, with the nutrients it holds, is washed into streams and reservoirs where it contributes to eutrophication and lowers water quality.

Ayers is permitting the bulldozed material to decompose naturally, lessening the possibility of soil erosion. Sometimes the trees and brush are left where they fall, but often they are formed into loose piles or placed into adjacent gullies. This has created excellent quail habitat. Coupled with ample water from numerous stockponds and adequate food, the practice has had a beneficial effect on quail populations.

Brush placed in the gullies also has been beneficial from another significant standpoint. The velocity of winter runoff water in the gullies has been greatly reduced, thereby limiting the sediment that the water can carry as well as reducing the cutting effect of the water. As a result, growth of the gullies has been slowed considerably and sediment pollution of downstream ponds and waterways reduced.

Removing woody vegetation but leaving five to 10 trees to the acre, followed by seeding improved plant varieties (Lana vetch for example), will increase forage production for use of livestock and wildlife as well as minimize erosion.

Proper management of the total resource, including plants, land, livestock and wildlife, is essential for complete resource use.—WARREN W. BROWN, district conservationist, SCS, Red Bluff, Calif.

Piles of brush on Sam Ayers' cleared range reduce erosion and provide quail habitat.





Jack Gray adjusts a motor on one of his rental boats at Gray's Ranch.

Oklahoma

Owner adds camping to his ranch plan

Gray's Ranch is one of the finest campgrounds on sprawling Grand Lake in northeastern Oklahoma.

Most of the land surrounding the big lakes is federally owned in Oklahoma. Jack Gray's farm is an exception. He bought the land with its mile of lake front in 1945 soon after the lake was built. He wanted to raise cattle, but the idea of recreation development was in the back of his mind.

As a cooperator with the Ottawa County Soil and Water Conservation District, Gray worked with District Conservationist K. C. Bennett of the Soil Conservation Service in carrying out a conservation ranch plan. The plan included improved pastures and stock ponds for the cattle.

Gray noticed in a newspaper that SCS was giving help to landowners who wanted to develop recreational enterprises. He got in touch with Bennett again.

The recreation plan Gray worked out with Bennett's help included a landing strip, a 2,500-foot access road, a swimming beach, and sites for 30 mobile homes.

"We agreed not to disturb the natural beauty of the area any more than necessary," Gray said, indicating some of the stately trees around the grounds.

As many as 300 persons have camped at Gray's Ranch over a weekend. It is a popular place for the meetings of camping clubs. Out-of-state automobiles and trailers are a common sight. But normally the camp is not too crowded for a visitor to find a suitable place for enjoying the serenity of the quiet countryside.—Dan F. Croom, information specialist, SCS, Stillwater, Okla,

Utah

A problem becomes a park

The city park in Lindon, Utah, is —as parks should be—a place of beauty and fun.

Residents and visitors alike relax in its quiet surroundings or enjoy

its playground.

But not many months ago officials of the city and the Hollow Water Irrigation Company whose canal and ditches crossed the park were ready to write it off as a nightmare to forget.

The park area, a gift to the city by the Lindon Lions Club, was so chopped up by the waterways that usable areas were limited. Native vegetation choked the canal and ditches, and seepage was a problem. Visitors often were at odds with the users of irrigation water. Maintenance costs of park and canal system soared.

The irrigation company officials asked the Alpine Soil Conservation District for help. The Soil Conservation Service conservationist assigned to the district suggested a plan which, in cooperation with Lindon, could solve the company problems and in addition improve the park area.

The plan called for the collecting of springs and seeps, new irrigation pipelines and channels, and relocating the waterline, powerlines, roads, and rest rooms. Construction was begun and the irrigation company, with assistance from the Agricultural Stabilization and Conservation Service and SCS, installed 1,000 feet of drainpipe, 500 feet of irrigation pipeline, and 1,100 feet of concrete lining.

The city of Lindon leveled the area, moved about 25,000 cubic yards of earth, and relocated the waterline and powerlines. The city also planted grass and installed two ball diamonds. The Lindon Riding Club added a lighted horse arena.

The park today? It's an asset of which any city could be proud. To the people of Lindon it is a matter of special pride. Their planning and effort made the change.—Gerald Hansen, resource conservationist, SCS, Provo, Utah.

Illinois

Reduced tillage wins championship

John F. Brokaw, an Illinois farmer and the 1969 national champion soybean grower, used reduced tillage methods to help produce more than 76 bushels of soybeans an acre. His record won an all-expense trip to Japan for himself and his wife, Majorie.

Brokaw, a cooperator with the Henderson County Soil and Water Conservation District, chopped corn stalks in the fall and plowed the field in the spring. He used a four-row minimum tillage planter set at 36 inches, then doubled back down the middles to make 18-inch rows. Success with his weed-control program had convinced him he could safely use the narrow rows, rotary hoe once, and eliminate all row cultivation. It worked.

The Brokaws operate a 400-acre stock and grain farm 2 miles west of Raritan, Ill., where he maintains a 180-beef-cow herd on improved pasture. Mr. Brokaw is attending Western Illinois University, working toward a degree in psychology.

—JAY FARR, district conservationist, SCS, Stronghurst, Ill.

Tract is converted to camping and fishing

People stopping for fishing supplies and camping information prompted W. C. Monroe, Jr., to start a camping and fishing enterprise in Clay County, Tenn. It is known as Riverside Camper Park.

Monroe's store is near the outer edge of Celina between this county seat town and Dale Hollow Dam, 4 miles upstream on the Obey River. The dam was built by the U.S. Army Corps of Engineers in the early 1940's. The fishing and recreation lake is popular among outdoor lovers within a 200-mile radius, seeking the challenge of record-breaking smallmouth bass, rainbow trout, or huge walleye.

Monroe got to thinking of a tract of land between his store and the dam and remembered an artesian well which resulted from an oil driller's failure. He discussed the potential of these 7 acres and the artesian well with the local directors of the Hull-York Resource Conservation and Development Association and the soil conservation district supervisors of Clay County. The Soil Conservation Service provided technical help to plan the two-fold recreation enterprise.

Monroe built five small lakes to grow catfish, using the artesian well as the source of water. He leased adjacent land, built 2,500 feet of access road, and established 24 modern hookups for mobile campers.

The park is proving to be a favorite spot for outdoor families.

"I've only been in business during one tourist season," said Monroe, "but business is good. Campers come in for one or two nights and stay a week. Twenty-three of the 24 hookups were filled over the 4th of July weekend. Those disappointed in their fishing at Dale Hollow Lake or in the river assured themselves of a fish fry by catching a catfish or two from one of the small lakes."—M. B. SIMPSON, district conservationist, SCS, Celina, Tenn.

Range fire triggers new resource plan

A new approach to resource conservation planning in Idaho got its start 3 years ago when 82,000 acres of rangeland in southern Twin Falls County was burned in late summer.

Through a mighty team effort involving the ranch operators and federal and state agencies, the disastrous effects of the fire were held to a minimum. Measures insuring rehabilitation of the damaged area were virtually complete by snowfall.

Since that emergency, the combining of forces in planning is an approach that has gained widening acceptance in Idaho. We call it "coordinated resource conservation planning." It works.

Altogether the agencies and individuals invested a third of a million dollars in the rehabilitation effort. Funds for the work came from federal and state agencies—the Soil Conservation Service, Forest Service, Agricultural Stabilization and Conservation Service, Bureau of Land Management—and from the Idaho State Land Department and Idaho Fish and Game Department. Local banks made loans to landowners.

Seeding of forage grasses and plants needed by wildlife for food and cover began at once. Siberian wheatgrass and intermediate wheatgrass were seeded on the burn. Bluebunch wheatgrass and Idaho fescue came back naturally on the unburned areas.

In some of the burned areas Ladak alfalfa was seeded with the wheatgrass to provide for upland game birds such as chukkar and gray partridge and sage grouse.

Watering troughs for livestock

were placed where they would be needed. Some of the troughs were fitted with "dicky bird diving boards," small ramps, to permit safe wildlife use of the water.

As a result of the experience, resource-management plans are being developed to protect the investment in public and private money. The plans are "total resource" plans. They take into account all resource-conservation needs and interests. Private owners, the Bureau of Land Management, and the local soil conservation district are the leading participants.

The goal is to provide for longterm management of all the natural resources of the rangeland, whether the resources are public or private.

The cooperative resource plans have been worked out step by step with Twin Falls County ranchers, John Miracle, Ed Baker, Floyd Sharp, and Laird Noh. BLM area managers, Bob Brock and Ken Kuhlman, and the SCS range conservationist and others provided the technical assistance.

Watersheds were given primary consideration because the downstream communities are dependent upon the clean water that flows from these ranges. The dollar returns from livestock grazing, while vital to the individual using this resource, are actually secondary in relation to the total needs of the watershed.

Floyd Sharp, Twin Falls County rancher, left, discusses his grazing program with conservation specialists. The need for the highest quality forage yield on a sustained basis is met by designing grazing programs encompassing all the resources used by the livestock producer. Programs are developed to meet the needs of the particular forage plants and type of livestock of the ranch. No two grazing programs are the same.

The food and habitat requirements for wildlife are given consideration. Bitterbrush, the main winter forage for mule deer, has been planted, and it is hoped the plants will increase naturally. The primary byproduct of managing this wildlife habitat is improved hunting. Public picnic areas offer clean, clear drinking water, and the wide open spaces also provide a recreation use for this resource.

The end result of people working together is a practical resource-conservation plan satisfying all the needs of those using and those managing the rangeland environment.—Gary R. Evans, range conservationist, SCS, Pocatello, Idaho.



Oklahoma tour links history, conservation

By Myron A. Hurd District conservationist, SCS, Claremore, Okla.

Residents of Rogers County, Okla., are discovering new scenic, historic, and conservation points of interest they somehow had previously overlooked. A succession of increasingly popular tours has been the means.

A fourth tour will have area eyes on the resplendent fall foliage and on the conservation work of landowners along the way.

The tour idea took hold after specialists of the Soil Conservation Service made an inventory of the area's rich potential for recreation and historic-site development. It was an idea that fitted into the program of the agriculture committee of the Claremore Chamber of Com-

The chamber committee enlisted the Claremont Garden Club and the Pocahontas Indian Women's Club in starting things off in April 1969 with a dogwood-conservation-historical tour. More than 450 residents joined the 2-hour adventure on a Sunday afternoon. Others obtained descriptive literature prepared by the committee and drove the 47-mile route later.

Flowering dogwood, conservation practices, and historic sites seemed to draw equal attention on the tour.

Encouraged, the committee held a foliage-conservation-historical tour in October 1969 and the second dogwood-conservation tour in April 1970. The number of participants increased each time, and additional organizations offered to help as cosponsors.

In addition to the original sponsors, the Catoosa, Chelsea, Inola,

and Oologah Chambers of Commerce, Chelsea Garden Club, Will Rogers Round-Up Club, Citizens Band Radio Club, React Club, and Civil Defense group joined in.

The chambers of commerce adopted the spring and fall tours as annual events. Tentative plans are being discussed for permanent markers for historic sites and for maps to designate the sites considered most important. The spring and fall tours then can be routed to include the historic sites while presenting the conservation points of interest, flowering dogwood in the spring, or foliage in the fall.

The multiple-interest tours seem to reach the more than 90 percent of nonfarm residents as well as many who occupy and farm the land and whom conservationists have served.

Although the conservation practices shown are largely conventional for the area they add much landscaped beauty to the land and give the viewer a knowledge of land uses and treatment.

Most soil depletion and erosion in the area has occurred since Oklahoma became a state 63 years ago and land passed to private ownership. Some 75 percent of the topsoil was lost from many farms. Wheat production dropped.

Since the Rogers County Soil and Water Conservation District was organized in 1943, most of the 1.870 landowners have become district cooperators. They have built 600 miles of terraces and diversions, more than 4,000 ponds and reservoirs, drained 3,000 acres, planted 60,000 acres of tame pasture, and restored about 180,000 acres of native bluestem grasses with rangemanagement practices. This has given stability to the agriculturally based economy.

Rogers County history dates from the arrival of the Osage Indians from Kansas in the French-owned Grand River Valley in 1796 and the purchase of these lands by the United States with the Louisiana Purchase in 1803.

The formation of Indian Territory resulted in removal of Osages to the Osage Nation, starting about 1809, and removal of the Cherokees from Georgia, North Carolina, and Tennessee in 1837.

The War Between the States resulted in an exodus of Cherokees to Texas or Kansas. In 1867 the Cherokees returned from the Civil War and established Cooweescoowee District, Cherokee Nation, with the seat of government at Kephart Springs. The seat of government was moved to Claremore after the Frisco Railroad was built in 1882. The Indian Nation had its own government until Oklahoma became a state.

In addition to the homes of the earliest Cherokee settlers and the village sites of Chief Blackdog and "Clahmo" of the Osages, the county contains sites of the old Cherokee courthouse, three voting precincts, Cherokee schools, churches and cemeteries, and other points of historic interest.

The home of Will Rogers, world famous cowboy, actor, and humorist, built by his father Clem in 1875, is now a state park and one of the tour stops.

There are probably few counties or conservation districts in the United States that do not have sufficient attractions for multi-interest tours. Since touring is one of America's foremost recreation activities, the problem is merely marking enough of the varied attractions along all weather roads and then providing a touring guide for tourists to follow.

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National issues challenge Recreation and Parks

The 1970 Congress for Recreation and Parks sponsored by the National Recreation and Park Association will take place September 27-30 in Philadelphia, Pa.

Among topics to be explored are: "National Issues and Critical Relationships;" "Legal Action to Promote Environmental Quality;" "Parks and Recreation: The Challenge of Manpower;" and "NRPA in the 70's."

A "first time" congress feature offers educational tours and includes onsite educational sessions; authoritative briefing at each tour location; and opportunities for in-depth analysis of operational details, manpower problems, programing, finance, and legislation.

Fire and management symposium topics

The Intermountain Forest Fire Research Council will sponsor a symposium in Missoula, Mont., October 27-29, on "The Role of Fire in the Forests of the Intermountain West." The discussion parts will be "Natural Role of Fire," "Man's Impact," "Fire Management Direction," and "Conclusions." Sessions will be mainly on the campus of the University of Montana with portions in the Florence Hotel.

Societies discuss many conservation problems

The International Association of Game, Fish and Conservation Commissioners will meet jointly with the American Fisheries Society, September 16-18 in New York, N.Y.

Some objectives of the association are: (1) Cultivate more mutual understanding among officials or coordinate the efforts of agencies engaged in conservation of natural resources and for the protection, preservation, and management of wildlife, forests, waters, and soils; (2) promote fish culture and fisheries management, and investigate and advise with respect to the introduction of new species and varieties of fish, game, and useful birds; (3) create and foster a healthy public sentiment in favor of better laws for protection of natural resources; and (4) assist the duly constituted authorities in enforcing laws for the protection of natural resources, including wildlife and its habitat.

Dates and places

September 13-16, Farm and Industrial Equipment Institute, Toronto, Canada.

13-16, American Fisheries Society, New York, N.Y.

16-18, International Assoc. of Game, Fish and Conservation Commissioners, New York, N.Y.

27-30, National Recreation & Park Association, Philadelphia, Pa.

October

4-8, American Forestry Association, Atlanta, Ga.

4-9, Water Pollution Control Federation, Boston, Mass.

4-9, International Union of Biological Science, Washington, D.C.

7-10, National Conference of Editorial Writers, Boston, Mass.

10-14, American Bankers Association, Miami Beach, Fla.

11-15, Society of American Foresters, Las Vegas, Nev.

12-16, Future Farmers of America, Kansas City, Mo.

17-21, American Institute of Planners, Minneapolis, Minn.

18-21, American Chamber of Commerce Executives, Pittsburgh, Pa.

19-23, American Society of Civil Engineers, New York, N.Y.

21-24, National Association of Biology Teachers, Denver, Colo.

22-24, Association of Engineering Geologists, Washington, D.C.

26-30, American Water Resources Association, Las Vegas, Nev. ♦

Review



The Soil Conservation Service. By D. Harper Simms. 1970. Praeger Publishers, New York. 210 pp., illus. \$8.50.

Until March 1968, D. Harper Simms was Director of the Information Division for the Soil Conservation Service. He has written a book which should be tremendously useful in schools of agriculture and in SCS's own extensive training program. Hopefully, with the increasing attention to quality of environment, it will also reach many students in other academic disciplines. It shows how, working within the system and in opposition to some powerful vested interests, a monumental job in arresting the destructive exploitation of our renewable resources has been achieved. It points the way toward further progress. It succeeds in being both encyclopedic and readable, a rare combination.

Following a short history of the early years of the agency, the author describes in detail its organization and programs. Then its relations with soil conservation districts, with state governments and land-grant colleges, with other Government departments and agencies within the Department of Agriculture, with the Congress, and finally with the public are discussed.

The reviewer is a little disappointed that the image of Bennett as a master of bureaucratic intrigue does not come through more clearly. The author does not tell us directly that the controversy between Bennett and the USDA Bureau of Soils (where Bennett was a junior officer) was behind the establishment of the Soil Erosion Service outside of the Department. In this and in other instances Bennett bypassed his superiors. Furthermore, he neglects to mention that many of Bennett's early demonstration projects were on the farms of men who had political muscle. Secretary of the Interior Harold Ickes' objections to demonstrations on private land led Bennett to seek the transfer of the Service back to the Department of Agriculture. His career demonstrates mastery of "the art of the possible," an indispensible skill for those who would implement peaceful change.

Career civil servants in SCS will enjoy reading this book for its nostalgic accounts of battles fought and won. Those who have been stung by the criticisms of Robert J. Morgan, Marion Clawson, and Charles M. Hardin will be comforted by Harper Simms' rebuttal. The future contribution of SCS to preserving and enhancing man's environment seems unlimited if the agency has the wisdom and the foresight to take up future challenges as it has those of the past.—Jane M. Porter, historian, Economic Research Service, Washington, D.C.

Wildlife for America. By WILLIAM R. VAN DERSAL. 1970. Revised and enlarged edition. Henry Z. Walck, New York. 160 pp., illus. \$6.00.

Wildlife for America is the second in Dr. Van Dersal's trilogy of books on resources to be brought up to date and enlarged in response to the growing concern for the natural environment.

Like *The Land Renewed* (1946, rev. 1968) and *Water for America* (1956), it was coauthored originally with Edward H. Graham, who did not live to participate in their revision.

The new edition of "Wildlife" uses the same format as its companions: A brief essay on a single topic on every other page, each faced by a handsome photograph on the same topic. The style of writing is simple and direct; it presumes no prior knowledge of the subject by the reader.

Even more, perhaps, than the other two books, Wildlife for America sets forth the viewpoint, the rationale, and the operating program of the Soil Conservation Service

with respect to the resource under discussion. Although not conceived primarily as a wildlife conservation agency, SCS from the beginning has followed an official line of concern for wildlife as a product of the land.

Both Dr. Graham and Dr. Van Dersal, each in turn as head of the wildlife (or biology) division of the Service, helped to develop and shape that policy. In his dedicatory note, Dr. Van Dersal credits the beginning of that philosophy to the first man to lead the wildlife and biological work of SCS, Ernest G. Holt, "one of America's great wildlife conservationists."

The text, however, is free of any agency "slant" that would affect the reader who did not recognize the origins of the ideas and practices set forth. The book stands on its own merits as a lucid and informative introduction to wildlife conservation in America.—B,O,O.

New publications

Frontiers in Conservation. 1969. Proceedings of the 24th Annual Meeting Soil Conservation Soc. of America, August 10-13, 1969. 159 pp. Soil Conservation Soc. of America, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021. \$5. Contains 44 papers. Majority of the papers presented are under the headings: "Soil and Land Management to Meet Conservation Goals," "Water Resources Utilization and Management," "Wastes in Relation to Agriculture and Society," "Outdoor Recreational and Natural Beauty Needs and Opportunities," "Urban-Suburban Conservation," and "Utilization of Land to Meet Future Needs." The proceedings also contains information about the society's technical committees and the papers of a student symposium.

Propensity for Change Among the Rural Poor in the Mississippi Delta: A Study of the Roots of Social Mobility. By C. Hobson Bryan and Alvin L. Bertrand. 1970. USDA Agr. Econ. Rpt. 185. 22 pp. Describes the characteristics of poor family heads in rural areas who have high potential for breaking out of poverty. Data were obtained from a randomized, block sample of 1,249 rural inhabitants in the Delta areas of Arkansas, Missouri, Mississippi, and Louisiana

Proceedings of the National Conference on Sediment Control. Washington, D.C., Sept. 14-16, 1969. 1970.

U.S. Dept. Housing and Urban Development, Office of Metropolitan Planning and Development, Office of Planning Assistance and Standards. 53 pp. Presents 10 papers by a member of the U.S. Senate, specialists in federal and county governments, and a national association.

Change in Farm Production and Efficency, A Summary Report. 1970. USDA Statistical Bull. 233. 17 pp. Combines major time series data to facilitate an appraisal of changes in farm production, production inputs, and efficiency. Data are presented for the United States and for most series by the 10 farm production regions. A brief text highlights changes from the previous production year or the base period.

Search for Solitude, Our Wilderness Heritage. 1970. USDA PA-942. 32 pp., illus. \$0.65. Handsomely illustrated in color. Presents history of the wilderness and primitive areas and lists the areas in the National Forests in California, the Northwest (Oreg. and Wash.), the Rockies (Colo., Idaho, Mont., Nev., Utah, Wyo.), the Southwest (Ariz., and N. Mex.), the Lake States (Minn.), the Southeast (N.C.), and the Northeast (N.H.) with a map showing these areas.

How a Tree Grows. 1970. USDA Forest Service and Soil Conservation Service FS-32. 8 pp., illus. \$0.10. Gives the parts and stages of growth of the tree, the close relationship between the tree and the soil, and a description of the soil in the Northeast and Great Lakes Region.

Pollution Caused Fish Kills 1968. 1969. U.S. Dept. of Interior, Federal Water Pollution Control Administration. 16 pp., illus. Annual census of fish kills began in June 1960; since that time 103,380,000 fish have been reported killed in 2,830 incidents. Highlights are given from the reports.

Reclamation's Recreational Opportunities. No date. U.S. Dept. of Interior, Bureau of Reclamation. 10 pp., illus. \$0.25. Lists facilities and recreation uses on Federal Reclamation projects in the U.S.

Got a Forestry Problem? Extension Foresters Can Help. 1970. USDA Cooperative Extension Work. 8 pp. A folder with information on Extension forestry and the address of the director of the Extension Service in each State.

Soil surveys

Randall County, Texas. By Louis Jacquot, Luther C. Geiger, Billy R. Chance, and Wilbur Tripp. 1970. 61 pp., illus.; with maps 3.17 inches to the mile (1:20,000).

Recon...

Southern Pacific Railroad estimates annual savings of more than \$52,000 a mile from a windbreak and dikes along 9 miles of track near Palm Springs, Calif., reports Woodland Conservationist SCS Robert A. Dellberg. The firm estimated that the protective planting of tamarisk will double the life expectancy of rails as well as reduce sand damage to trains and safety equipment. SCS recommendations through the Coachella Valley Soil Conservation District helped the railroad company deal with a sand problem that had plagued officials since 1879.

Schedules and methods for erosion control during highway construction must be approved by New Jersey state highway engineers before contractors may start work on federally aided projects. Contractors must incorporate all permanent control measures as early as possible. They must also be ready to use temporary controls such as seeding and mulching to correct conditions that may not have been foreseen during the design stage. State engineers have the authority to limit the surface area exposed by excavation, borrow, and fill operations. Under no conditions will the area exposed by clearing and grubbing exceed 750,000 square feet without the supervising engineer's approval.

Flood-insurance studies are being done by SCS for the Federal Insurance Administration, U.S. Department of Housing and Urban Development. Flood-zone maps and actuarial rate tables will be used by FIA to determine those areas eligible

for federally supported flood insurance as well as premium rates for property. Actuarial rates for buildings and their contents are based on computations of average annual damage that relate flood frequency and damageable values at varying elevations. Studies have been completed for the city of Matewan and part of the Mate Creek watershed in Mingo County, W. Va.; and Pompton Lakes, N.J. Similar studies underway involve areas in Fairfax City. Va.; Columbus, Ga.; Sinton and Agua Dulce, Tex.; Lincoln, Nebr.; Fort Dodge, Iowa; Rochester, Minn.; Fargo, N.Dak.; and West Hartford, Conn.

A 2-vear program of sedimentcontrol demonstration and evaluation is starting in Columbia, Md. Hittman Associates, Inc., has developed a plan for gathering technical and economic performance data on storm runoff pollution abatement methods. District Conservationist Elmer Sauer, assisting the Howard Soil Conservation District, and the Maryland State Office of the Soil Conservation Service are assisting the private research and development contracting firm that made Columbia its headquarters early in the life of the 3-year-old "new town" between Washington, D.C., and Baltimore, Md. Project staff will work with builders through the Rouse Company, chief coordinator of development in the 15,000-acre tract in the Howard Soil Conservation District. Studies will be conducted in a 200-acre watershed within the town, concurrent with the urbanization of a presently rural area. Effectiveness and feasibility of control measures will be reported. The \$432,000 project administered by the Maryland Department of Water Resources will be funded in part by a grant from the U.S. Department of Interior, Builders will be reimbursed only when researchers ask for work exceeding requirements of the state's sediment control law.

Student power helped Conway, N.H., with its solid waste-disposal problem. Four engineering students from the University of New Hampshire volunteered to live near the town and supervise construction of an open pit incinerator. Under guidance of an instructor from the university's engineering experiment station, students surveyed the site, laid out plans, prepared specifications and did final drawings for a smokeless, forced-air incinerator now in operation. Conway, the North Country Resource Conservation and Development Project, Inc., New Hampshire-Vermont Development Council, and the New England Regional Commission are backing the project.

Green wood excelsior mulch is a satisfactory replacement for straw mulch held in place with asphalt, according to Minnesota Highway Department tests. Both may be used to prevent erosion on newly seeded roadsides. Although long-fibered wood excelsior fibers need not be tacked down with asphalt, they must be green and of proper length for the desired clinging effect. Excelsior mulch has an advantage over straw in builtup areas because the chance of spraying buildings and cars with blowing asphalt is eliminated.

Differences in insurance premiums may figure in both the crusade for flood prevention and the case against flood-plain development. Actuarial insurance rates (i.e., those based on the real degree of flood risk) can vary within the same community. For example, in Alexandria, Va., a homeowner in a highrisk section may pay as much as \$2.63 per \$100 of property value. In minimal-risk sections, the rate is as low as 5 cents per \$100. Based on these figures from the April 1970 issue of Changing Times (The Kiplinger Magazine), the annual premium for a \$20,000 house could range from \$30 well above the high water mark to \$526 in a floodprone area.

From the Administrator:



A part to play

We have met the enemy, and he is us.
This comment by Pogo in the comic strip
so well fits the subject of the environment
that it is a slogan of many activists today.

Every citizen—consumer and conservationist alike—has had a part in creating the kind of environment we all live in, and he has both the chance and the responsibility to help improve it.

Someone else said, "Why does it take less energy to form a Committee To Improve the Environment than it does to bend over to pick up a gum wrapper?" This suggests that positive action begins best at home.

More people need to stop harping about the environment and start helping. Their energies are needed for both litter-picking and committee work—and more. Their understanding is needed if concern is to be translated into meaningful action.

With the current emotional pitch of environmental concern in the United States, it is easy to forget that many people have worked most of their lives to improve the environment—and with significant results. Leaders of 3,000 local conservation districts, 2 million land owners and operators, and thousands of professional conservationists in SCS and many other agencies have been working together. In many areas, their efforts have made the water cleaner, the air fresher, the land better looking and more useful.

Conservation districts continue to broaden their programs to do a better job in environmental improvement. They continue to get more and more requests for help. They would welcome some new hands and new ideas.

The Soil Conservation Service and other agencies continue to adapt conservation measures to new environmental uses, to develop new conservation measures for specific environmental needs, and to give the best help possible in "traditional" conservation work that already has made a telling impact on environmental quality. We, too, welcome new hands and new ideas.

Conservation districts and agencies together have some challenges in their mutual efforts:

- To see that all conservation work is installed with full attention to its overall impact on the environment;
- To see that all conservation work is properly maintained so that its impact continues to be favorable;
- To see that all special-interest groups have the opportunity to participate—from the outset—in planning conservation projects;
- And perhaps most important of all, to help inform the public accurately about the state of the environment and alternatives for its improvement. Meaningful individual action and meaningful community planning come from understanding the facts about the condition and the potential of natural resources.

This Nation can gain a high standard of living for its citizens without losing those very resources that make this country a good place to live. We have the technology; there are growing indications that we have the will and the willingness to pay the cost of a high-quality environment. I am confident we will make it, if we individually and collectively work toward the goal.

Kenneth E. Grant

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Wild cane supplements tree windbreaks

Wild sugarcane, a plant brought to Hawaii by the early Polynesians, is being put to a use the "old Hawaiians" never anticipated.

Polynesian immigrants to the Waimea district used the cane as a source of sugar and used parts of the plant for braiding hats and thatching houses.

Modern farmers in the area long have been troubled by blowing soil and wind damage to crops, especially to new seedings. They had planted miles of tree windbreaks in the older homestead section, but they needed still more protection.

One of the first problems faced by farmers when the Lalamilo farmlots were opened in 1961 was the development of windbreaks. They knew that tree windbreaks are the best long-term protection. But for immediate protection they needed something that would be easy to establish and that would require a minimum of space.

Tests showed wild sugarcane could give good protection in about 6 months. The cane stands straight, does not spread rapidly, and takes only a 6- to 10-foot strip of land out

of crop production. Farmers found they need to space the windbreaks every 80 to 120 feet. The cane grows about 10 feet tall and gives protection horizontally for 10 to 12 times its height.

With assistance from Soil Conservation Service specialists working with the Mauna Kea Soil and Water

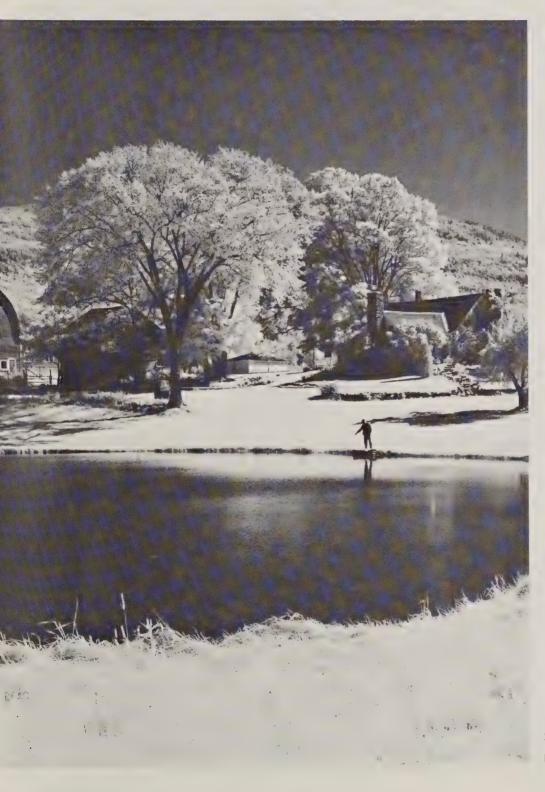
Conservation District and from the State Division of Forestry, Lalamilo farmers now are planning and planting windbreak systems using primary windbreaks of trees and secondary windbreaks of the wild sugarcane.—GENE COX, assistant state resource conservationist, SCS, Honolulu, Hawaii.





Ten-foot-tall, thick growing wild sugarcane, quick to establish and sturdy against the strong Hawaiian wind, has proved a boon to Lalamilo farmers waiting for tree windbreaks to develop. Inadequate windbreak protection (below) means the lifting of soil by the wind and harm to young crops.

© conservation



Plants and man

Soil Conservation Service
U.S. Department of Agriculture



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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

CLIFFORD M. HARDIN, Secretary of Agriculture KENNETH E. GRANT, Administrator, Soil Conservation Service BEN O. OSBORN, Editor GEORGIE A. KELLER, Production Editor

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On the grow . . .

Plants, long a workhorse in soil and water conservation, are showing new uses and new values—and SCS is finding new ways to help plants do their many jobs.

In the world of grass, SCS range conservationists put useful facts in a computer to better aid landowners (p. 51). Grasses serve to heal Nevada fire scars (p. 62) and treat wastes at home in Wisconsin (p. 63) and at a cannery in Texas (p. 54).

Trees, once thought of only as timber, serve to regulate the environment (p. 56); mend wornout farmland in Michigan (p. 57) and Illinois (p. 58); and help man in many ways (p. 59).

Even the peanut gets in the conservation act, protecting roadbanks in Hawaii (p. 53).

Check Administrator Grant's editorial (p. 71) for some cogent comments about the role of these and other plants in the big assignment of resource conservation and environmental improvement.

COVER: A picture of a pond—but note how trees and shrubs also help in making this Vermont home a picturesque landscape.



Computer reads the range

By Thomas N. Shiflet
Range conservationist, SCS, Lincoln, Nebr.

Computer management of rangeland? Ridiculous? Not at all—at least when you know how it works.

In 1967, the Soil Conservation Service began work on a computer system that would enable it to give more efficient help to range owners and operators cooperating with conservation districts.

The system is the Range Data System—RDS. It is closely akin to automated systems in other disciplines such as woodlands and soils.

When it is complete, the RDS will be made up of several parts or

SCS-RANGE-417 Rev. 6-69 (File Code RANGE-12)

subsystems. These will include production and composition data by plant species from soil taxonomic units, brush-control data, and, possibly, runoff and soil loss information.

Most of the effort so far has been put into developing the part dealing with plant production and composition. Information gathered is on a standard form. The information can be key punched directly from the form and fed into the computer. The machine digests and reduces the data to the desired form and values and sets them for storage in

SCS range conservationist (above) clips range vegetation on an ungrazed site. Facts about plant kinds and weight of growth will be recorded on a form (right) that can be read into the computer "data bank."

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PLANT YIELD RECORD for RANGELAND, GRAZABLE WOODLAND, AND NATIVE PASTURE



The Range Data System will help SCS range specialists and landowners plan best use and treatment of sites such as this excellent range in the Pedernales Conservation District in Texas.

a national "data bank."

Each stored data set will consist of several plots of production and plant-composition data by species or groups of species on one soil taxonomic unit, along with:

- (1) Locator data—state, county, major land-resource area, and state plane coordinates of the sample area where the data were collected.
- (2) Environmental data average annual rainfall, elevation above sea level, exposure, slope, grazing history, and other items that have a direct influence on productivity and species composition.

These data are collected at field locations. SCS state office personnel check and edit them before they are forwarded to the data center at the Midwest Regional Technical Service Center, Lincoln, Nebr. This method assures that only high-quality data will be "deposited" into the bank.

Eventually the data bank will contain thousands of such data sets and provide a core for designing resource inventories on rangelands. It will include considerable data already on hand that have been collected over 14 years by the Soil-Range Interpretation Team. The bank itself will be started as soon as compilation of the National List

of Scientific Names is completed, and permanent symbols for all plants have been chosen.

The data bank will be extremely helpful to SCS in improving technical competence in range-conservation planning and application work. Many computer programs will be developed to utilize the stored information.

An important use will be improvement and strengthening of work-unit technical guides. The grouping of two or more soils in a single range site for management purposes can be tested. The stored data on the soils in question can be retrieved from the data bank and analyzed to see if the soils do produce the same kind, proportion, and amount of vegetation. Likewise, trends in range improvement or deterioration will be better documented, giving field personnel better information on which to "read the range."

The system will enable SCS to better correlate range sites across state and administrative boundaries by retrieving and analyzing the data from any geographical area.

Status reports generated from the system will show which soils lack data and will provide a basis for scheduling by field personnel to get this information.

Use of the RDS will not be limited to rangelands. Many other practical and scientific uses can be made of it. Much of the information recorded and stored will be useful in such areas as wildlife habitat, hydrology, soil correlation, recreation, and others. Data now being collected on grazable woodlands and native pastures will be stored and used in a similar manner.

The RDS is being developed in close coordination with systems of other disciplines in the SCS Management Information System so data can be freely exchanged. For example, if a soil profile description, site-index data, and grazable-woodland production data are collected from the same sample area, this will be noted in each data system. The information from each system could be recalled, combined, and analyzed if needed to study a particular problem.

No range can be managed by computer alone. Onsite assistance of a competent conservationist and effort by the conservation district cooperator remain vital. The computer can, however, help that conservationist improve the quality and efficiency of the assistance he gives the cooperator.

Peanut cuts roadside erosion

The peanut, although not common to Hawaii, is becoming a popular plant on the island of Maui. But its value isn't in gracing Hawaiian nut bowls.

The versatile plant is showing promise for roadside stabilization and beautification along Maui highways. It is one of several plants suggested for erosion control and beautification by the Soil Conservation Service.

When the Central Maui Soil and Water Conservation District received a request from the Hawaii Division of Highways to help select erosion-control plants, the district turned to SCS.

The SCS Plant Materials Center on Maui had been testing various types of peanut plants for about 6 years, Center Manager Earl Lewis reported. Specialists at the center selected five kinds of peanuts to combine with two types of grasses on a trial site that had been suffering erosion damage. The site is a cut along Kaahumanu Avenue, the island's busiest thoroughfare.

Both grasses have become well established on the test site, and the peanuts have produced strong runners, according to Lewis.

With irrigation and fertilization, the plants can be expected to develop a solid mat of roots and leaves for an attractive and protective cover. Showy yellow blossoms grace several of the peanut varieties—but the perennial plants do not produce an "eating-size" peanut.

SCS provided plants and technical help. The Division of Highways is furnishing other materials and maintenance.—ARNOLD NOWOTNY, district conservationist, SCS, Phoenix, Ariz., formerly at Wailuku, Hawaii.



The peanut's matted root system and strong runners give it promise as a conservation plant.





A bank along Maui's main highway, center, was a raw, sediment-producing eyesore. At right, PMC Manager Earl Lewis checks growth of peanut-and-grass planting that will protect the bank.

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Land and plant cover solve waste problem

By Marshall H. Nichols
District conservationist, SCS, Paris, Tex.

A soup canning company in Paris, Tex., has used soil and plant cover to solve an out-sized pollution problem.

The company processes up to 3.6 million gallons of waste water a day through a system which combines perennial vegetation, diversion terraces, grassed waterways, grade-stabilization structures, and overhead irrigation sprinklers.

The water that flows from the treatment area, the company reports, is clean and clear.

In 1960 the Campbell Soup Company bought 600 acres at the edge of the city for a plant site. A factor in the location was suitability of the site for an industrial waste-disposal system. The city's treatment facilities could not handle the volume of waste water the plant would produce from washing vegetables.

The Lamar County Chamber of Commerce asked the Soil Conservation Service for help in locating possible sites where soil permeability rates were greatest. Soils of all possible sites were evaluated by SCS soil scientists. But other factors—nearness to railroads, accessibility, and drainage—limited possible sites to soils with slow permeability rates.

Soils at the site selected by the company rated very low in permeability—0.05 inch an hour. This made it impossible to filter the waste water by soil percolation. This factor also causes soils to be more susceptible to erosion during heavy rains. The addition of waste water daily would surely intensify the erosion hazard and produce tons of sediment and pollution in the main streams of the watershed if something wasn't done.

The site was mostly old eroded cropland with soils low in fertility. Low-quality grasses, native shrubs, and small post oaks had taken over the open field areas. Gullies were still active 20 to 30 years after cultivation was stopped and were too deep to cross.

A study was made of adapted plants first. The vegetation planned had to provide a cover suitable for filtering the large volume of waste water, while handling 44 inches of annual rainfall on soils which could soak up only 0.05 inch an hour.

And the cover had to work the year around.

Land clearing, land smoothing, revegetation, waterway shaping, terraces, and mechanical structures were planned to stabilize gullies and control erosion.

In September 1960, contractors began preparing the land for purifying waste water by allowing the water to flow over grass. This is the "overland flow method." Land was cleared, gullies filled, waterways and drop structures installed, and slopes carefully landplaned. The slopes were smoothed to assure uniform flow of water at a rate that would allow waste particles to be filtered out by vegetation. The terraces were laid out in 1963 to intercept the water after it had been filtered, then to conduct it to the grassed waterways, and divert it from other filter strip areas below.

The area was seeded to reed

Dominant stand of reed canarygrass that filters Campbell plant waste (above). The author, right, and Gus Harris, Jr., of Campbell Soup check growth of reed canarygrass, tall fescue, and other grasses. Sprinklers in background operate 5 to 8 hours a day all year long. canarygrass, redtop bentgrass, and tall fescue, all northern species requiring high fertility. Bermudagrass was rejected because of its long winter dormancy. Some bermudagrass was used, however, to sod plant the waterways and was then overseeded with the northern grasses more tolerant to water.

In periods of dry weather before the spray system was used, the grasses were maintained by supplemental irrigation. Complete commercial fertilizers were applied. In the area where the subsoil was exposed, however, the cool-season northern species died; hardier native vegetation replaced them.

Waterways and grade-stabilization structures were designed by SCS engineers who also recommended size and spacing of diversion terraces.

When the processing plant began operation in the fall of 1964, the spray area had a good stand of mixed grasses with isolated areas of fescue and reed canarygrass. In sandy areas, a strong stand of bermudagrass was noted. Under tests with heavy application of waste water in winter 1964 and spring 1965, the bermudagrass deteriorated and turned black. By April it appeared to be dead, but 2 weeks after the tests stopped, new growth appeared. Waste-water applications were resumed and continued throughout 1965 without detrimental effects to the bermudagrass.

Near the end of fall 1965, cool

weather slowed the growth of native plants, and the cool-season northern species began to flourish.

After extremely wet seasons in the winter and spring of 1968 and 1969, it was evident that native grasses cannot compete with reed canarygrass when plant nutrients are supplied in quantity from the decomposing organic matter in the waste water.

Louis C. Guilde, director of environmental engineering for the company, described the system to the 42d. annual conference of the Water Pollution Control Federation in October 1969. He said that in 1960, "the magnitude of the undertaking represented an unprecedented effort in soil reclamation and conservation, but experience indicated that the eventual land use efficiency would have been improved if the effort had been bolder."

The company won top national honors at the annual Sports Foundation, Inc., awards program in 1970 "for achievement in the control of water pollution."

Allyn C. Bennett, SCS engineering specialist, observed the system in operation in November 1969 and said, "it is apparent that this overland-flow method of waste disposal is highly successful." He believes that better land use could be achieved by a system of parallel terraces instead of the semiparallel diversion terraces. This would provide a uniform trickle-flow distance through vegetation. He pre-

dicted that principles of waste disposal learned from this operation will be used to improve the design of other waste-disposal systems.

"For example, the uniform trickle flow through vegetation is probably more beneficial than sprinkler spraying, which means that a gravity-flow system with more solids in the water would also work very well," Bennett said.

In the system, vegetable solids and grease are trapped or strained from the waste water, which is then run through an automatic sprinklerirrigation system onto vegetated and terraced fields. Sprinkler laterals are below, or on the lower side, of each terrace. The sprinklers spray the wash water onto the land. Then it trickles through the vegetation down to the next terrace, then into a system of vegetated waterways. Grade-stabilization structures are located at the outlet of each of the two main waterways leaving the The trickle-flow distance needed to adequately lower BOD (bio-chemical oxygen demand) at this plant is 200 feet or less. Uniform slopes with a minimum of ponded areas are more efficient.

Good-quality hay is harvested from the spray area. And regular removal of excess vegetation appears to boost efficiency of the disposal area. Guilde reported that, "the process also reclaims a high percentage of plant nutrients. These nutrients fertilize the grasses, and analysis of the hay showed the mineral content to be nearly double that found in other good-quality hay with high nutritional value ranging up to 23 percent crude protein. In feeding tests, cattle showed a definite preference for hay grown on the disposal sites."

There is a continuous streamflow downstream from the spray-area fields without the unsightly aquatic vegetation which would be expected from most waste-disposal areas.

An advantage of the system is its ability to function in all types of severe weather conditions without reduced efficiency.



Trees-regulators of the environment

By Jacques J. Pinkard
Woodland conservationist, SCS, East Lansing, Mich.



Michigan windbreaks protect farmland from erosion and perform many other jobs.

What is a tree worth? You can get many answers, but the 375 million or more trees that have been planted by the soil conservation district cooperators in Michigan alone—on more than 400,000 acres—are an indication of the value people place on them.

Trees are essential to life on our planet. They moderate temperature and affect pollution, noise, wind, and water.

As trees grow, they provide a home for wildlife and products for our daily living. In old age, they are cut, and in their place is space for a new tree to grow.

The daily evaporation from a single well-watered tree can produce an estimated cooling effect of more than a million British thermal units. This is equal to 10 roomsized air conditioners operating 20 hours a day.

Because of the "greenhouse" effect of waste particles in polluted air, the air temperature may be 20° F. higher in urban settings than it is in nearby rural areas. This can be an important reason for having green space in cities.

Trees absorb polluted air and emit air richer in oxygen and somewhat freer of pollutants. A growth of 1 ton of wood releases at least 1.1 tons of oxygen and absorbs at least 1.5 tons of carbon dioxide. An assumed production level of a

ton of wood per acre on ½ billion acres a year shows the size of this natural working force.

It has been recognized that our oxygen reserve is being reduced by burning fossil fuels. Removal of large areas of plants—for people—is reducing the oxygen supply. It is thought that three-fourths of the conversion of carbon dioxide back to oxygen takes place in the ocean—but trees play an important part on the land.

Forests and rows or clumps of trees dampen city noise. Each 100 feet of forest is now believed capable of dissipating about 6 to 8 decibels of sound. This can be put in perspective by realizing that a human ear has the ability to detect 1 decibel, ordinary speech is at about 60 decibels, and the range of audibility is considered to be 130 decibels.

A windbreak provides full protection to an area 10 times its height and some protection for 20 times its height downwind. A 5-row windbreak 35 feet tall will reduce a 35 mile-an-hour wind in the lee 100 feet. The wind will have built up to only 15 m.p.h. in the lee 200 feet.

Fuel use in the home can be reduced 20 to 30 percent by properly located windbreaks. Livestock will gain faster and require less feed where protected by a windbreak.

There will be better calving and lambing where stock is protected by windbreaks. Windbreaks in Michigan preventing sugar beets from blowing out are known to have saved \$60 an acre in replanting and other costs. Where blowouts occur 3 years in 12, the benefits amount to \$5 for every dollar spent. The gamble of being without adequate windbreaks is poor; a 2-row windbreak may be established at an annual cost of only \$1.06 for each acre protected,

Tree cover, needles, and leaves protect the soil from the impact of raindrops. Trees protect the water supply by improving the filtering and holding capacity of the soil. Peak flows can be lowered. Surface runoff from hardwood forests protected from grazing is only about 5 percent of that from permanent meadow. Soil loss is only about $2\frac{1}{2}$ percent.

Wildlife living space, food, and cover are provided by trees. Forest type, productivity, growth rate, trees per acre, age and size, extent of acreage, and other factors influence the value of various foods that the trees may provide.

Wild turkeys nest in thickets or fallen trees. Oak acorns make up one-half to two-thirds of the diet along with other nuts and seeds.

Mourning doves nest 15 or 20 feet up in trees (or shrubs) such as

elm, box elder, and soft maple. Doves eat Russian olive and red cedar berries.

Flickers and woodpeckers, sapsuckers, bluebirds, house wrens, and screech owls—to name a few—nest in hollow trunks or limbs.

Other nongame birds need clumps of cedar, spruce, pine, autumn olive, and other wildlife plants.

Hungarian partridges and other birds need windbreaks around crop fields.

Each day a 150-pound deer eats 10 to 12 pounds of oak, cherry,

balsam, mountain ash, willow, beech, alder, maple, hemlock, white cedar, red maple, poplar, and other plants. A felled 4-inch cedar may provide 17 pounds of browse. When alive it may provide browse for many years.

A cottontail rabbit eats birch, maple, willow, dogwood, sumac, and others.

Tree squirrels den in holes in trees. Two or three trees of 15-inch diameter with a 4-inch-diameter hole at the 20-foot level are adequate to encourage the squirrel population. Squirrels eat their

weight each week in berries, cherries, nuts, acorns, pine and maple seed and hazel nuts, and buds of elm, maple, Osage orange, and yellow poplar.

Ruffed grouse need woods openings. They eat juneberry, thornapple, mountain ash, cherry, alder, aspen, beech, birch, dogwood—400 or 500 kinds of plant flowers, buds, fruit, and leaves.

The worth of a tree goes far beyond the concepts of economics. Chlorophyll-bearing green plants make life possible for other organisms on earth.

Trees put farms back on tax rolls

By Henry Dierking

District conservationist, SCS, Muskegon, Mich.

Thirty years ago the two newly formed soil conservation districts serving landowners of Muskegon County, Mich., set out to get trees on as much of the county's eroding, tax-delinquent and poorly producing acres as possible.

Critics said it wouldn't work. They insisted that the hand-planted seedlings would die and that so much of the county's area ought not to be in trees anyway.

The years have proved the district leaders right. Millions of trees planted in the program have been a useful conservation crop for many landowners on once eroding, submarginal farms; and they have produced numerous other benefits.

More and more farms in the county were becoming delinquent on the tax rolls when the district leaders decided that reforestation might reverse the trend. They began by establishing tree nurseries on the farms of Olaf Hostad, chair-

man of the South Muskegon District, and Hans Agard, chairman of the North Muskegon District.

Every year for many years each of the nurseries distributed a million healthy, vigorous tree seedlings to landowners.

Hostad, still an active district director, points out that the district nurseries played an important role in supplying tree stock to encourage people to reforest severely eroded fields, establish needed windbreaks, improve odd areas for wildlife food and cover, and beautify highway and recreation areas. Commercial growers now supply most of the stock for these purposes.

In all, about 35 million trees have been planted, 200 miles of windbreaks established, and 2,500 acres of wildlife habitat improved in the two districts.

Christmas trees, a byproduct of the reforestation drive at first, have become a useful and profitable crop. There are several hundred Christmas tree plantations in the districts, many of them on what was once wind-eroding, submarginal land.



These Norway pines are on the farm of Rev. Moses J. Jones, left, a South Muskegon SCD cooperator since 1941. That year the district tree nursery on the farm of Director Olaf Hostad, right, supplied the seedlings to Reverend Jones for the planting. And one pine plantation now makes a scenic and profitable snowmobile trail.

Hostad sums it up this way: "Tree planting is by no means done. About 15,000 more acres need reforesting or interplanting. But we have come a long way. Serious erosion has virtually been stopped.

Our people frequently express a sincere satisfaction in the many conservation accomplishments, and they will look to the districts for guidance in solving their conservation and mounting pollution problems. And last but not least, tax-delinquent lands in Muskegon County are nonexistent."

Forest planted long ago is a conservation landmark

By William M. Clark

Woodland conservationist, SCS, Champaign, III.

In 1905, Alfred N. Abbott, troubled by the sight of erosion on his Illinois farm, wrote in his diary:

"This is mostly high rolling Mississippi River bluff land, very sandy—some portions consisting of drifting sand."

That year, he also began planting trees that now—65 years later—are the Abbott forest.

Howard Abbott, the youngest of the three Abbott sons, is the present owner and operator of the land. Since 1944, when the Whiteside Soil and Water Conservation District was organized, he has man-

aged the farm according to a conservation farm plan.

At about the time the elder Abbott noted in his diary the condition of his land, he also appealed to the "Department of Forestry" in Washington, D.C. A forestry specialist helped draw up a plan, recommending a shelterbelt of cottonwoods on the west and Osage orange and white pine over the rest.

Alfred Abbott and sons Louie, Bayard, and Howard did most of the planting over a 7-year period. They added black locust, tamarack, maple, walnut, and hickory.

That first winter, Howard Abbott recalls, rabbits destroyed most of the white pine, Osage orange, and cottonwood seedlings. That meant replanting the next spring.

New varieties included that year were Norway spruce, ash, elm, cedar, catalpa, and hackberry. Abbott remembers that in a half-day they planted 1,800 white pine and 400 Norway spruce seedlings in the nursery plot. His father, in a diary entry dated May 5, 1906, recorded that they had planted 15,400 trees that spring.

Rodents — rabbits and mice — continued to give trouble. The Abbotts set out poisoned apples and put coal tar on the trees. But the damage went on.

Howard Abbott uses walnut from the farm forest to build grandmother clocks like this one.

As the forest grew, there were fires. The CB&Q Railroad crossed the farm. In dry times fires started from sparks from the locomotives.

But the plantation continued to grow. By 1930 the trees were advanced enough for checking of growth rates.

In 1940, the Soil Conservation Service and the Whiteside District began tours for school groups and others in the Abbott timber. The farm was gaining recognition as a conservation showplace.

The first true marketing of timber from the Abbott forest was in 1953 after a particularly damaging fire. Damaged trees were harvested. Salvaged logs were made into lumber at a hastily set up sawmill. The material obtained was enough for six buildings, including the one that houses the sawmill.

Later, Bayard Abbott began furnishing Osage orange lumber to an acquaintance in Memphis — for processing of police night sticks.

In 1969, Howard Abbott opened bids on walnut trees that Lloyd Casey, district farm forester, had marked for harvesting. A Kentucky firm bought the 40 trees for \$3,150.

Almost every kind of tree planted by the Abbotts was chosen to some degree with its value to wildlife in mind. Food and shelter were principal concerns. The plantings were never considered as being suitable for deer, but deer nonetheless have become residents of the forest. They browse on brush and hide from hunters.

The Abbott brothers are proud of the conservation legacy left them by their father, whom they have always regarded as a pioneer. They say it was he who encouraged Frank O. Lowden, Governor of Illinois during World War I, to start conservation forestry in Ogle County, now the Sinissippi Forest.

The Abbotts hope that in time the land their father saved through his conservation efforts will be designated a state park or memorial in his name.

Trees are for people



By Carrow T. Prout, Jr. Chief forester, SCS, Washington, D.C.

If you are the owner of a woodland tract, the odds are four to one, the statisticians say, that you want no cutting of timber on your land. You want the woodland as it is for personal appreciation and enjoyment.

In consideration of this interest, as well as for the 3 million owners of forested land who grow trees for sale, the Soil Conservation Service long has clung to the view that trees are for people.

Forest industries and related inindustrial enterprises play an important role in the Nation's economy. Demand for the products of the forest increases each year. The per capita use of wood and wood products grows steadily as does the population.

Timber for a Nation

Two centuries ago most of this Nation was covered with virgin forests that helped feed, clothe, and sustain the native population, which then was the Indian. In New England about 80 percent of the land, except in Maine, had been cleared by 1770 for cultivation and for pasture.

In the colonies south of New

England, trees were looked upon as the principal obstacle to growth. Lumber was the number one asset.

By 1870, the pasture and cultivated fields of New England had been abandoned as their owners moved westward. These abandoned lands produced a young and vigorous crop of white pine that, in another 30 years, would make white pine king and bring the center of the lumbering industry to the Northeast.

Forest lands for agriculture

To the West and South, forest lands still were being cleared for agriculture, for roads, and for the new cities and towns. The process of the Northeast was repeated in the South. In many counties more than 80 percent of the land was cleared for cotton, corn, tobacco, and peanuts.

Still another century of growth and development has passed. And perhaps in the decades ahead this Nation will see more drastic changes in the attitudes and use of forest lands than have occurred since settlement back in the 1600's.

In working with landowners throughout the Nation, the district

Trees are for people to walk among . . .



OCTOBER 1970



Trees make a house a home . . .

conservationists of the SCS frequently help district cooperators plan the use of their forested lands for personal needs and desires.

Trees, the conservationist knows, are for people. Trees are for everyone . . . to make an open field a park . . . to beautify a street . . . and make a house a home . . .

Trees slow the wind . . . settle the dust . . . buffer the raindrops . . . stop erosion . . . and hold the snow.

"Wolf tree"

What the conservationist once called a "wolf tree" may be the answer to a small boy's dream of the ideal tree to climb . . . or hang a swing in . . . or to bask in the shade of . . . or to get a kite caught in,

Trees are for people to walk among . . . for squirrels to hide in . . . and for hunters to stalk in. Trees are for people to look at . . . for birds to build nests in . . . and

Trees are to climb in . . .



And to pitch a tent under . . .



for bird watchers to peer into.

District conservationists of SCS know the kinds of trees that furnish the best nesting sites, the best food, and the best cover for birds and other animals that people watch and that people hunt. Provisions for leaving or growing these kinds of trees can be incorporated into the conservation plan. Standard woodland-conservation practices such as tree planting, woodland improvement, or woodland harvesting can be modified so that trees are left properly spaced to hang a hammock between . . . to pitch a tent under . . . or to have a picnic beneath.

SCS conservationists, who work with the cooperators of the more than 3,000 soil and water conservation districts of the Nation, now look at wooded lands in a new way. Trees are for people. And conservation plans may be tailored to make trees serve any needs and desires people may have. •



Trees are for hunters to stalk in . . .

And to build a nest in . . .



Trees are for everyone . . .



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Quick work after a Nevada burn . . .

Grass and teamwork heal fire scars

By J. Boyd Price and William L. Dunning
Range conservationist, Reno, and district conservationist, SCS, Minden, Nev.

The fire that Sunday—July 28, 1968—escaped control in the hottest part of the day. Racing before a stiff breeze, it burned a house, split into prongs, and headed for Carson City from two directions.

As the flames approached the city, residents began to flee their homes.

Firefighters finally brought the fire under control. The townsfolk realized at once that they faced another potential disaster—flooding—unless the vegetation was restored. This was dry country—but on the east slope of the Sierra Nevada, rains can come in high-intensity downpours. Erosion and the deposition of sediment, the product of erosion, can be costly.

The fire had burned the plant cover from 1,600 acres of soils that are predominantly granitic and highly erosive on complex slopes and exposures. Further complicating the problem was the ownership pattern, 25 percent Federal and 75 percent private. Eleven private ownerships and two Federal agencies were involved.

Governor Paul Laxalt of Nevada proclaimed an emergency and appointed State Forester George Zappettini chairman of a rehabilitation committee. Representatives of the University of Nevada; Nevada Fish and Game Commission; Ormsby County; Carson City; Soil Conservation Service; Agricultural Stabilization and Conservation Service; Forest Service; Bureau of Land Management; and private landowners made up the committee.

Most private landowners with property in the burned area are

cooperators with the Carson Valley Soil Conservation District. Lester Stodick, district board chairman, was asked to coordinate activities with the owners.

Planners decided on immediate aerial seeding to take advantage of the ashes for covering the seed, and then a comprehensive plan for effective permanent protection.

The Carson Water Company, a cooperator with the Carson Valley District and owner of the largest tract within the burn, contributed \$2,500 for aerial seeding. Carson City, Ormsby County, the Nevada Division of Forestry, and the Bureau of Land Management contributed money and material to seed the entire area by helicopter. This work was completed within a week.

In the meantime, the planning committee worked out a rehabilitation program. Steps included:

A soil survey by SCS and the

Forest Service, drill seeding of accessible areas, tree planting on suitable sites, and terracing and planting of critical slopes.

Soil Scientists Norman Bare of the Forest Service and Warren Archer of SCS completed a soil survey in record time. With this information the treatment was scheduled.

On March 25, 1969, SCS received an emergency grant of \$5,000 for drill seeding the suitable soils and slopes. Snow was almost gone, so timing was critical.

The Carson Valley District was ready to take over the operation, in cooperation with the Carson City board of supervisors. Through their effective leadership and cooperation, equipment was on the site within a week.

Two crawler tractors owned by the Carson Valley District were hitched to drills furnished by the Bureau of Land Management. Tractor drivers were under the supervision of the Carson City Engineering Department. Carson Valley District Equipment Manager John Indiano kept the equipment rolling with the help of Ormsby County Roads Superintendent Jack Butti. SCS provided technical assistance.

Part of the area now known as the Carson burn. Drill rows of Nordan desert wheatgrass are returning stability to the denuded slopes.



The burned stumps of Anderson Peachbrush and wild rose were just right for puncturing tires on the rangeland drills, but 10 days and twice as many flat tires later the job was done.

Topar pubescent wheatgrass was seeded on the better soils, with Nordan desert wheatgrass on the remainder. Good soil moisture at seeding time and an early June storm were favorable. An excellent stand of grass emerged. Landowners helped by keeping livestock off the seedings.

City residents got into the act. Four thousand Ponderosa pine seedlings were obtained from the Nevada Division of Forestry and planted by the service clubs of Carson City. This project, known as "Operation Pine Plant," was accom-

plished with the help of 4-H clubs, Scouts, and high-school volunteers.

As a final step, 87 acres of very steep land was contour-trenched and seeded to Siberian and crested wheatgrass by the Nevada Division of Forestry. Technical guidance from the Toiyabe National Forest staff was used to treat the lands too steep for ordinary measures. The access road and 10 additional acres were stabilized. The job was completed in November 1969, 16 months after the fire.

Outstanding cooperation from all individuals and organizations turned a complex situation from a potential disaster to a successful conservation feat. Some of the watershed already looks better than before the fire. A few more years will make a great deal more difference.

Gravel and grass . . .

Mound systems aid in sewage disposal

Many families in the Clark County Soil Conservation District in central Wisconsin live in areas of nonpercolating soils where septic tanks can't work right.

The answer to a mounting pollution problem may lie in a system developed by Soil Conservation Service specialists working with local officials. It's a gravel mound topped by a layer of soil and grass, a sort of septic tank above ground.

Since few homes in the area are served by municipal treatment systems, many families have had to rely on septic tanks—and effluent coming up to the surface or fouling ground water has been commonplace. A recent survey showed that an average of 27 septic tanks per township were draining directly into roadside ditches. One family was emptying sewage into an abandoned

well, an almost certain source of ground-water contamination.

The problem was mounting. Communities were becoming increasingly aware of pollution and the accompanying disease threat. Dairy farmers with inadequate disposal systems were having trouble obtaining Grade A milk certification. And a new Wisconsin law prohibited building on nonpercolating soils where municipal sewage-treatment plants were not available.

State authorities proposed sewage-holding tanks for families without city sewage service or functioning septic tanks. Although some mobile home communities are using this technique, costs for individual families were prohibitive.

District Conservationist William Ludwig of the Soil Conservation Service, County Agricultural Agent Arvin Dopp, and County Zoning Administrator Earle Smith went to work on a solution that would be economical and practical. They decided the best way to overcome the difficulties would be to build septic fields above ground.

Their plan, developed after consulting with SCS engineers, was to use a mound of gravel covered by a layer of fill earth planted to grass. They had learned that a similar system had been developed by the U.S. Department of Health, Education, and Welfare for an area in North Dakota (described in the Manual of Septic Tank Practice, an HEW Public Health Service publication). Features of this "Nodak mound system" were adapted by the Clark County team.

In installing the mound system, the site is dug out to a depth of 1 foot. A layer of gravel or sand is placed in the excavation, and perforated tile lines are placed, with a covering of washed rock or gravel.

The bed is covered by sand or gravel and topped with fill dirt. Grass growing in this soil draws liquids through the filter bed and removes them by evapotranspiration. This process is essential, Ludwig and his associates explained, to keep the field from filling with trapped liquids.

The mound must be carefully seeded and the grass cover mowed frequently.

A typical mound is 25 by 60 feet and about $3\frac{1}{2}$ feet high.

A modification involves the laying of two sets of lines, one near the surface to take full advantage of summer functioning of the grass and the other deeper to avoid freezing in winter.

Ludwig reports the cost of the above-ground installation is about \$1,000. State officials have approved the system's use only on an experimental basis, but the installations—the first built over a year ago—appear to be doing a safe, efficient job.—Frank Cross, *Information Division*, SCS, Washington, D.C.

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Wood crop gains in Kansas

Timber—black walnut in particular—is gaining in importance as a crop in eastern Kansas.

In the Elk County Soil Conservation District, for example, is 15,000 acres of commercial timber, most of it in fertile valleys. Forty landowners in the district have given attention in the last 3 years to improving their wood crops in quantity and quality.

Bur oak, American elm, hackberry, green ash, and black walnut are the main species.

Tree farmer Earl Thornton set out 3 years ago to improve his black walnut timber stand on the 160 acres he owns in Elk County. Soil Conservation Service and Extension Service specialists helped Thornton develop his timber-stand improvement plan.

One phase of the plan was girdling weed trees, such as elm, Osage orange, and black locust. Wild grapevines were cut to prevent damage to the walnut stand. Thornton

Earl Thornton estimates growth of walnut tree.



planted 100 black walnut seedlings and planted stratified black walnut seeds in open spaces to fully stock the stand. The stand is now growing at a rate of about 175 board-feet per acre per year.

Roy Robertson, with 10 acres of native hardwoods on his 600-acre farm, improved his timber stand early in 1970. He takes time from his business in Wichita to cut weed trees, chop vines, plant trees, and carry out other woodland-improvement practices.

Demand for most Kansas hard-woods for veneer, wallboard, and furniture construction is increasing. More Kansas landowners are considering wood as a commercial crop each year.—F. DEWITT ABBOTT and GLEN SNELL, state resource conservationist, Salina, and district conservationist, SCS, Howard, Kans.

Nebraska

Phone cable exposed, SCS gets the call

Everybody knows underground telephone lines are supposed to stay buried. They don't always. In open country, wind and rain can dig them up—given a chance.

Landowners Stanley Jaiser and John Pollard in Dodge County, Nebr., learned what can happen when an eroding water runoff channel and a buried cable intersect. They handled it by getting the right people on the phone.

One of American Telephone and Telegraph's transcontinental cables passes through the two farms just above the junction of two waterways. Concentration of runoff had created an ugly gully at that point, but doubt about the solution had delayed action on the problem.

When it was discovered the problem involved not only farmland but also a costly telephone installation, the need for action became urgent.

Engineers of the Soil Conservation Service produced the solution. They recommended a steel-lined mechanical spillway to get the runoff water downhill. The combined grade control-detention storage structure not only stabilizes the eroding land, but also gives flood protection to 300 acres below.—LEROY O. KRAMER, district conservationist, SCS, Fremont, Nebr.

Michigan

Lawn instead of gullies

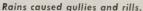
When Rev. and Mrs. Kenneth Oster moved into their new home near Cedar Lake, Mich., last fall they found themselves surrounded by some serious soil erosion problems. They called on the Soil Conservation Service for help.

Although the house had been built 4 years earlier, the front and side yard had not been properly graded or seeded. Heavy runoff from snows and rains of 1969 had carved huge gullies in the yard and a 15-foot high bank that falls off to a small creek. With winter coming on, the bare soil was a target for even greater destruction.

After checking the site, SCS Conservationists John Young and I drew up a plan to stabilize the area with grass and prevent further erosion. It called for regrading the steep bank to a more gentle grade and constructing a diversion to prevent excess water from flowing over the bank. This required a dragline and bulldozer. A seedbed then was prepared and a heavy application of fertilizer applied. The area was seeded to a mixture of red fescue and ryegrass, which will require relatively low maintenance. Part of the area, to be used as lawn, was hand-sodded and seeded.

The Osters, no strangers to tedious hand labor, did the hand work







The Oster's front yard takes on a new look.

and seeding themselves. As missionaries for the Seventh Day Adventist Church, they had worked at similar tasks for 20 years in far-off Iran.

Reverend Oster is pastor at Clare and Mt. Pleasant churches, and his wife teaches at Cedar Lake Academy.

They have further plans for their 15-acre property, including a wild-life pond and woodlot-improvement work.—Jack D. Lake, district conservationist, SCS, Stanton, Mich.

Ohio

SCS plays role in community's plan

Residents of Woodville, Ohio, are proud of their achievement in what they regard as "community conservation."

The Soil Conservation Service had a part in it.

When the town set out to build a new swimming pool in its community-conservation program, officials asked the Sandusky Soil and Water Conservation District for information on the flood plain of the Portage River. Hydrologic and soil information was made available by SCS, enabling architectural consultants to locate and design the pool.

The community also wanted a low dam on the river to impound enough water to allow boating and improve fishing. The SCS provided information on topography, soils, and hydrology. The information was used by a consulting engineer in the design, plan, and specifications for the dam.

The community also cleaned up a mile of the river's course through the area and began work on a new sewage system. A larger library and historical museum were a part of the improvement program.

In its assistance to Woodville in building a better community, the SCS team worked with the Woodville Recreation Board, headed by Sanford Price, and with the Library-Museum Building Committee, directed by Mrs. Ruth Judd.—John E. Battles, district conservationist, SCS, Fremont, Ohio.

New York

Community links golf with economy

Recreation development, along with the fun it offers to a community, can mean a quickening of the economic pace of the area as well as adding a pleasing touch or two to the countryside.

Citizens of Ulster County, N.Y., worked together—with timely help from the Ulster County Soil and Water Conservation District and the Soil Conservation Service—to produce what they acclaim as "the most beautiful golf course between New York City and Albany."

They've found that the attractive 6,500-yard course will mean an income of more than \$62,000 an-

nually, with \$58,000 turned back into the community in the form of salaries and expenditure for utilities, equipment, and maintenance.

The course is a segment of the Rondout Pool, Golf, and Tennis Association's complex. It lies between the majestic Catskill and Shawangunk Mountain ranges. The soil is mostly silty clay loam, except for the highland where clubhouse and pool are on deep sand.

Designing ponds was one part of SCS's role in planning and development of the 18-hole course. One of the ponds is near the top of a promontory from which every hole is visible. Four other water hazards were developed.

One of the trickier parts of the conservationist's job was coordinating the ditching with the laying of irrigation pipes and construction of fairways and greens. The plan calls for 7,500 feet of tile.

SCS specialists, whose assistance in recreation developments is more and more frequently sought, are working in the Ulster County area on many recreation improvements for community benefit, such as town parks and beaches. Public officials sponsoring the improvements generally agree that these projects not only meet the outdoor recreation needs of residents but also provide jobs, produce tax revenues, attract new business, and enhance their community's natural beauty. — FRANCIS E. MULVANEY, district conservationist, SCS, Kingston, N.Y.

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Tribe invites settlers to lake homesites

For nearly 10 years George Kenote dreamed of a lakeside settlement for his fellow Menominee Indian tribesmen in Menominee County, Wis.

The dream now is a reality. Fifty new homes already have been built at "Lakes of the Menominees" north of Keshena, out of 2,400 homesites planned and 950 sold.

As vice president for land use and development of Menominee Enterprises, Inc., Kenote knew the people and the sources of help. He called on them.

In the "dreaming" stage he talked over the problems and opportunities with Soil Conservation Service personnel assisting the Menominee Soil and Water Conservation District. Basic soils data, engineering specifications, and water-yield facts came out of this inquiry. SCS later assisted in erosion control, bank stabilization, mulching, and criticalarea seeding work done by contractors. A request to the Economic Development Administration brought funds for an economic study.

At a public hearing in 1967 the proposal was approved to sell the lots instead of leasing them. Attorneys, real estate people, and private engineers took part. The Wisconsin Public Service Commission granted a permit to build dams to create the lakes. Local contractors were engaged for construction.

"Lakes of the Menominees" is now a partnership project between Menominee Enterprises and a firm of developers and builders. In the project, Legend Lake has 1,340 surface acres. It will offer swimming, boating, water skiing, fishing, and picnicking for local people and visitors as well as residents.

About half the lots have water frontage. The others have access to water through common-use parks and boat landings provided for offshore property owners. A third of the development area is to be retained in its natural condition for wildlife and open space. Zoning regulations control the use of the entire area.

It is estimated that the tax base in Menominee County will increase from \$19 million to \$40 million. Fifteen new businesses already have been established. Operation of the lakes and their new enterprises provides full-time employment for 32 local residents. The economic effect of this project is regional. It provides substantial new cash flow to surrounding communities.

Conservation enters the "Lakes of the Menominees" project in its finest role as an aid to sound planning for the use of resources. The well conceived and executed project will contribute greatly to a sound economic base for Menominee County.—HERBERT W. TAUCHEN, district conservationist, SCS, Shawano, Wis.

Tennessee

Hunting farm pays in fun

When Ralph Morton retired in 1968 after 30 years in the investment field, he formed a partnership with Henry T. Bunn of Memphis for a hunting development.

They bought 275 acres on Kentucky Lake in Henry County, Tenn., and set out to make it a "hunter's paradise."

"It was no mistake," he reports, looking back. "I'm having the time

of my life."

His first step was to become a cooperator with the Henry County Soil Conservation District. "I had ideas of my own, but the district arranged for the Soil Conservation Service to give us the fundamental help we needed early in the game. When you are planning to attract waterfowl, water is what you need—especially water where ducks and geese can feed."

The SCS crews surveyed a 3-acre lake and several small ponds, including feed ponds for ducks. Morton planted crops of corn, milo, and other feed in the ponds in summer and flooded the areas in fall.

In 1969, bobwhites, chukars, and pheasants were raised and released. Morton placed feeders over the area to encourage the birds to stay and to keep them in good condition.

Harvesting is a planned part of the enterprise. Shooting pits face Kentucky Lake on the expected route of the waterfowl.

Will the hunting project pay? Morton expects it to. Hunting last year was exceptionally good.

But earnings are only a part of his interest in making it go.

"When my friends spend time and money to come here to hunt, I want them to have the best recreation of this type than can be found anywhere."

For Morton, the enterprise is already paying its way in great personal satisfaction.—GLEN S. ELKINS, district conservationist, SCS, Paris, Tenn.

Ralph Morton, right, and the author are examining milo.



Meetings . . .

Foresters discuss trees and environment AFA

The 95th annual meeting of the American Forestry Association will take place October 4-7 in Atlanta, Ga.; theme is "Trees for a Quality Environment."

Timely topics include "Trees Don't Vote—People Do," "The Third Forest," "Trees for People," "A Farmer Looks at Forestry," "Youth Looks Ahead," and "TVA and the Environment."

Planned trips include the Piedmont National Wildlife Refuge, Georgia Forestry Commission, and the Fire Research and Seed Laboratories.

SAF

The Society of American Foresters will hold its annual meeting October 11-15 in Las Vegas, Nev. "Managing Environment—Role of Resource Professions" will be the theme of the meeting. Two subthemes are "Awareness and Commitment" and "Expertise." Topics to be discussed include "The Environmental Crusade in Perspective;" "Awareness of Problems, Alternatives, and Costs;" "Selection of Environmental Goals and Commitment;" "Designing the Environment;" "Enhancing Environment Through Science and Technology;" and "How Land Managers Use Resource Professions."

Engineers strive for better environment

"A Better Environment for the Metropolitan Area" is the timely theme of the American Society of Civil Engineers' annual meeting, October 19-22, New York, N.Y.

Among the many problems to be discussed are: Divided authority and responsibility for improving the physical aspects of our urban areas (among several states, hundreds of local governmental units, public authorities, and the Federal

Government); great disparity between tax revenues and funds needed to provide essential services; public resistance to programs designed to achieve the needed improvements; and lack of action-oriented plans for effective efforts to overcome environmental problems.

Program topics include: "Sewage," "Solid Waste," "Clean Air," "Water Supply and Treatment," "Utilization of Marginal and Man-Made Land," "Coastal Zone Management Related to Urban Development," and "River and Ocean Engineering."

Federation all out to reduce pollution

With the New England Water Pollution Control Association acting as host, the 43d. annual conference of the Water Control Federation will take place October 4-9 in Boston, Mass.

Topics such as "Viewpoints on Enforcement in Water Pollution Control," "Industrial Waste Case Histories," "Combined Sewer Overflows," "Oil and Pollution Prevention," "Regional Management of Wastewater Utilities," "Collection Systems Operation and Maintenance," "Ultimate Sludge Disposal," "Industrial Wastewater," "Estuaries and Coastal Waters," "Process Equipment Developments," and "Advanced Water Treatment," will be discussed. Several research symposia and operators forums also will be held in the concurrent sessions.

On October 7, designated as Industry Day, the National Council of the Paper Industry for Air and Stream Improvement, Inc., and the American Electroplater's Society will meet to discuss their particular problems.

Biology teachers to revolutionize biology

"Revolutions in Biology" will be highlighted at the National Association of Biology Teachers' convention October 21-24 at Denver, Colo.

Subjects to be presented in the general session are "Population Biology," "Molecular Bases of Energy Conversions in Photosynthesis," and "Biology Teaching in the 70's." Technique sessions will involve such subjects as "Membrane Microfiltration for Biology," "Curriculum Development," "Audio-tutorial," and "The School-Science Coordinator in Higher Education."

Dates and places

October 4-7, American Forestry Associaton, Atlanta, Ga.

4-9, Water Pollution Control Federation, Boston, Mass.

4-9, International Union of Biological Science, Washington, D.C.

7-10, National Conference of Editorial Writers, Boston, Mass.

10-14, American Bankers Association, Miami Beach, Fla.

11-15, Society of American Foresters, Las Vegas, Nev.

12-16, Future Farmers of America, Kansas City, Mo.

17-21, American Institute of Planners, Minneapolis, Minn.

18-21, American Chamber of Commerce Executives, Pittsburgh, Pa.

19-22, American Society of Civil Engineers, New York, N.Y.

21-24, National Association of Biology Teachers, Denver, Colo.

22-24, Association of Engineering Geologists, Washington, D.C.

November

5-6, American Forest Institute, Washington, D.C.

5-6, Keep America Beautiful, Inc., New York, N.Y.

8-11, National Association of State Universities and Land Grant Colleges, Washington, D.C.

8-11, National Forest Products Association, Dallas, Tex.

9-11, National Grange, Boise, Idaho. 10-13, American Association of State Highway Officials, Houston, Tex.

11-13, Geological Society of America, Milwaukee, Wis.

18-20, National Water Resources Association, Las Vegas, Nev.

24-Dec. 1, International Commission on National Parks, New Delhi, India.

27-29, National Association of Farm Broadcasters, Chicago, Ill. ♦



Report of the Secretary's Commission on Pesticides and Their Relationship to Environmental Health, Parts I and II. (1969). U.S. Department of Health, Education, and Welfare. 677 pp. \$3.

The commission's 14 unanimous recommendations and summaries of the five subcommittee reports make up part I of 37 pages. Part II includes more than 5,000 references in eight chapters as well as the detailed reports of subcommittees and panels. The sheer size of this report makes any brief review inadequate from the standpoint of subject matter.

The introduction states that "Our society has gained tremendous benefits from the usage of pesticides to prevent disease and to increase the production of foods and fibers. Our need to use pesticides and other pest control chemicals will continue to increase for the foreseeable future. However, recent evidence indicates our need to be concerned about the unintentional effects of pesticides on various life forms within the environment and on human health.

"After carefully reviewing all available information, the commission has concluded that there is adequate evidence concerning potential hazards to our environment and to man's health to require corrective action. Our Nation cannot afford to wait until the last piece of evidence has been submitted on the many issues related to pesticide usage. We must consider our present course of action in terms of future generations of Americans and the environment that they will live in.

"The field of pesticide toxicology exemplifies the absurdity of a situation in which 200 million Americans are undergoing life-long exposure, yet our knowledge of what is happening to them is at best fragmentary and for the most part indirect and inferential. While there is little ground for forebodings of disaster, there is even less for complacency. The proper study of mankind is man. It is to this study that we should address ourselves without delay."

There are 14 unanimous recommendations by the commission. They point to the urgent need for more research and for better cooperation and communications between and within Federal departments as well as internationally. They set forth clearly the need to develop standards and regulate the use and distribution of pesticides. Recommendation 3 devotes special attention to DDT and DDD. All uses of these pesticides should be eliminated within 2 years unless the uses are considered to be "essential to the preservation of human health or welfare and approved unanimously by the Secretaries of HEW, Agriculture, and Interior."

Most chapters in part II cite references; but chapter 3, dealing with the effect of pesticides on nontarget organisms other than man, does not—appending only a selected bibliography. There is no index, and the reports contain contradictions, resulting occasionally from varying interpretations of the same scientific papers. In all the thousands of papers and books cited or listed, Rachel Carson is not mentioned.—WILLIAM R. VAN DERSAL, deputy administrator for Management, SCS, Washington, D.C.

Representative and Experimental Basins, an International Guide for Research and Practice. EDITED BY C. TOEBES AND V. OURYVAEV. 1970. UNESCO (distributed by UNIPUB, Inc., P.O. Box 433, New York, N.Y. 10016). 348 pp. \$10.

This book, No. 4 in a series, is a contribution to the International Hydrological Decade. It is written for persons engaged in hydrological research or having a hydrology

background. It is a descriptive, mathematically oriented book that may demand more of the reader than a knowledge of the use of symbols and logical reasoning.

It will be published in English, French, Russian, and Spanish editions. The 52 contributors represent all major countries; many are listed in Who's Who, Biographies of Living Notables.

There are six chapters with a total of 525 references (1,225 entries). The preface contains a brief historical description of the International Hydrological Decade (IHD), 1965-74. Chapter 1, "Introduction," has an outstanding "Scope and Purpose" followed by 126 terms in a section entitled "Terminology". Chapter 2, "Selection and Organization of Basin Networks," covers the first step in any study. Proper expertise here can avoid future problems. The underdeveloped countries could be at great disadvantage in this and instrumentation phases. Chapter 3, "Planning of Observations According to the Research Objectives," covers the usual hydrologic subjects. Chapter 4, "Methods of Observation and Instrumentation," is the real meat of the book—it has 120 pages with numerous tables, photographs, and sketches. Chapter 5, "Data Processing and Publication," contains basic methods found in the developed countries. Chapter 6, "Analysis Techniques and Interpretation of Research Results," is for the expert analyst. Few laymen will enjoy this chapter, and even the "experts" will disagree on the interpretations.

The guide should be considered a good source book on systems hydrology and a first step to modern development. For a UNESCO paperback, the price is a bit inflated.—W. H. SAMMONS, hydraulic engineer, SCS, Hyattsville, Md.

Natural Principles of Land Use. By Edward H. Graham. (1944) 1969. Greenwood Press, Westport, Conn. 274 pp., illus. \$13.50. This book has had a significant and far-reaching effect on natural resource programs and is a familiar landmark to ecologists the world over. Its reissuance after many years out of print will be welcomed by serious students of the environment. It was originally published in 1944 by Oxford University Press.

The late Dr. Graham was formerly an assistant chief of the Soil Conservation Service and in the years immediately preceding his death made many important contributions to the work of the International Union for the Conservation of Nature.

An Economic Evaluation of the Great Plains Conservation Program. By James Kasal and W. B. Back. 1970. USDA Economic Research Service ERS 440. 41 pp., illus.

In the mid-1950's, as one of the most severe droughts in Great Plains history was in its final throes, agricultural leaders of the Nation proposed a somewhat different approach to solving problems of the land.

The program, which Congress authorized in 1956 as the Great Plains Conservation Program (Public Law 1021), offered Federal cost-sharing and priority technical help from the Soil Conservation Service to enable farmers and ranchers of the vast area to get needed conservation on their land as quickly as their own resources would permit.

In a few years Plains landowners, though slow at first to commit themselves to a program in which they were required to sign a contract with the Secretary of Agriculture, began to apply for help faster than appropriate funds would permit.

By the mid-1960's the Soil Conservation Service, believing that the increasingly popular program merited objective appraisal, arranged with the Economic Research Service to make a study to show whether early achievements would warrant extending the program beyond its projected termination date, 1971.

The ERS chose 14 counties in the

Plains—nine in northwestern Kansas and five in northeastern Colorado—and questioned 153 participants in the program and 217 nonparticipants.

The survey showed:

Owners of larger land units tended to outnumber others in the program. Participation was higher among full owners, and income of a majority was higher than the income of the average nonparticipant. Participants were a little younger, on the average and had more schooling.

Among reasons nonparticipants did not make use of the program were too many restrictions or an aversion to long-term contracting, belief that the program did not meet needs, and an insufficient understanding of the program.

One in five participants said his main interest in the program was to reduce soil erosion. One in seven wanted to increase his water supply or use water more efficiently. Increasing livestock operations, reducing farm workload, and improving wildlife habitat were among other reasons.

"More than two-thirds of the participants," the report said, "believed that the program had decreased soil erosion, reduced risk due to extreme weather hazards, and increased the water supply, the efficiency of water use, and the value of the land they operated."

The report contained few surprises. In fact, the Nation's agricultural leaders—and Congress—had already been convinced of the soundness of the program's structure and objectives. The program last year was extended by Congress, with several improvements, until December 31, 1981.—Norman A. Berg.

New publications

A New Prospect. By Louis T. Kardos. 1970. (Reprinted by permission from Environment, copyright 1970, Committee for Environmental Information.) Environment Vol. 12, No. 2, March, pp. 10-27. Story of Spring Creek and the beautiful Nittany Valley of

Pennsylvania. Dumping of chlorinated effluent in the creek, drawing large amounts of water from the ground-water reservoir, throwing natural fertilizer into the water, and introducing inorganic minerals onto the land caused the deterioration in that area. Experiments were conducted to transform sewage-waste water into usable water by first treating it, then sprinkling it on crop or forest land. The water seeps through the ground and is diluted by ground water. Nutrients from the sprinkler waste water are drawn into the plants and carried off with harvested crops such as hay, or, in the forest the nutrients from the waste water are cycled and recycled through the trees, other vegetation, and the forest floor.

Organization and Development of the Soil Conservation Service. Compiled by Robert L. Geiger, Jr. Rev. 1970. USDA Soil Conservation Service SCS-CI-13. 30 pp. Presents in detail Public Law 46 creating the Soil Conservation Service, and gives chronologically the organization and some outstanding events from the beginning of SCS to the present.

Proceedings of the 1970 Sprinkler Irrigation Technical Conference, Denver, Colo. 1970. Sprinkler Irrigation Association. Washington, D.C. 109 pp. \$8. Contains 15 articles on water conservation and sprinkler irrigation written by specialists in the federal and state governments, universities, and private industry.

USDA, A Guide to Understanding the United States Department of Agriculture. Rev. 1970. USDA Office of Personnel. 36 pp., illus. A short history of the Department beginning in 1839 and presenting the functions of various USDA agencies in graphic form.

Why Improve Channels? 1970. USDA Soil Conservation Service. 6 pp., illus. Tells how restoring streamflow capacity of small channels can help reduce flood damage, stabilize streambanks, and improve esthetic values. Relates channel improvement to the combination of conservation practices on the land and the system of floodwater-retarding dams and multipurpose reservoirs that make up the small watershed program under Public Law 566.

Soil surveys

Wells County, North Dakota. By J. B. Seago, M. Robert Wright, C. Howard Wiesner, and Ralph S. E. Smith. 1970. 84 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Recon...

The Nation's first ordinance banning the sale of throwaway bottles was passed in Bowie, Md., on July 20. Only returnable bottles of soft drinks, beer, and ale will be sold within city limits beginning next April. Testimony included such remarks as: "We're for a clean environment but this is the wrong way to go about it." (two local businessmen) "I hope that other jurisdictions will follow the lead of Bowie in passing such an ordinance . . . let's deposit the no-deposit philosophy in the trash can." (county planning commissioner) "The question is not whether we shall curb our convenience, but how drastically we shall do it and when. I suggest that a little inconvenience now may well preclude a much greater one later." (former city councilman) Representatives several national beverage and container manufacturers failed to convince council members to wait for industry to cope with its role in the solid-waste situation.

A Kansas contractor is mining freshwater fish and fun on 400 acres of land scarred by the search for coal. Although he is not a fisherman, W. J. "Red" Fox of Girard, Kans., has developed a recreation area that offers sportsmen a number of choice spots and species. Roads connect dozens of pits in the mine-dump area that Fox has been restoring for several years. Varying terrain and soil conditions made the tract an excellent area for training machinery operators. The retired contractor's winter and weekend development is a pilot project intended to show local leaders what can be done.

"Operation Saturation" is underway in Haywood County, Tenn. Willie M. Moore, soil conservationist, and Theodore Giles, county vocational agriculture instructor, have started a cooperative, countywide "seek and assist" program. They want to be sure that all minority-group farmowners know and understand the SCS services that are available.

Converting a deserted farm to a botanical garden for Yakima, Wash., is the aim of the Hi-Land (Wash.) Soil and Water Conservation District and Yakima Garden Clubs. SCS is providing technical assistance in leveling and shaping the land; designing the irrigation-drainage system; and planting ornamental trees and shrubs. Two of an eventual 60 acres will be planted to all varieties of fruit trees grown in the Yakima Valley.

Pollution down on the farm

"In the last analysis it is the agriculturist's own environment that is likely to receive the greatest harm, since effects are usually greatest near the source. In the Midwest, where heavy and frequent applications of nitrogen are the rule and where animal herds are concentrated in small areas, examples of serious damage to both surface and ground-water resources abound . . . The implications of these statements may seem staggering to an agriculturist already burdened with new products and practices, but the consequences to him may not all be negative. After all, animal feeds, fertilizers, and pesticides purchased and applied by him but not taken up and fully used in the production process represent a loss of time and money. Thus, prevention of environmental contamination may in many instances be synonymous with greater efficiency of production."—R. T. Og-LESBY, Department of Conservation, Cornell University, Ithaca, N.Y.

Basic provisions of state stripmining laws—especially reclamation requirements—have been summarized by the National Coal Association. Summaries contain briefs of laws in force for 18 states as well as federal regulations for surface mining and reclamation on Indian public land. The association keeps the collection current by adding new or amended statutes as state governments act in this area. For further information regarding copies of the summaries, contact the Soil Conservation Society of America, 7515 N.E. Ankeny Road, Ankeny, Iowa 50021.

Seven out of 10 Americans say that air and water in their communities are contaminated, according to a recent Harris survey. Since 1967, the number of persons in a national cross section of households who consider local pollution a serious problem has increased from 56 to 70 percent. A clear majority (53 percent) of the public feels that the situation is worse.

Conservation begins at home

But all of the awareness that you and I may have about environmental problems is of little worth unless we do something about it. Start from the top. Pick the first thing concerning quality of your surroundings that comes to your mind . . . Eliminate your own insults to the environment ... Starting your environmental campaign at home should prepare you with a clear conscience to tackle bigger projects. You will be in a better position to cast the first stone somewhere else once you've brought your own setting into line.-KARL F. LAGLER, professor of fisheries and zoology at the University of Michigan, Ann Arbor, to ENACT-a group of students, faculty, and citizens created at U-M to conduct environmental teach-ins and information programs.

Expendable environments

"The American way has been primarily pragmatic, and unfortunately this can be translated as piecemeal in respect to the environment. Freedom of the individual to locate a development or business wherever he saw a good spot may have been cherished in the past, but urbanization and development have proceeded to such a point in some parts of the Nationparticularly the Eastern States-that most available sites for expansion into 'expendable environments' have been used up.'-DAVID D. DOMINICK, commissioner, Federal Water Quality Administration.

From the Administrator:

Putting plants to work

Architect of the environment!

Can you think of a more fitting name for the soil and water conservationist, whose skills with plants and landforms make the world around us more useful, more stable, and more pleasing?

Of all the tools at his command—and he may call upon many—the grasses, shrubs, and trees are basic in his day-to-day work.

Most of the plants he uses play multiple roles—in holding the earth in place, furnishing food and shelter for animals, contributing to the economic stability of man and his community, repairing damaged land and improving its usefulness, and presenting a more comfortable and attractive environment.

Shaping the earth with machinery and building dams and other structures are other important elements of complete resource conservation. But the success of these engineering feats hinges on the efficiency with which plants carry out their assigned tasks of safely and attractively blending the new construction into the landscape.

Plants in the conservationist's toolbox have been assembled from many corners of the world. Some others right at home, once overlooked, have become Cinderella performers in conservation.

Through the slow and painstaking process of trial and selection, the discovery of species and their capabilities has gone on.

The process has produced trees for erosion control, for wildlife shelter, for mined-land restoration, and for farmstead protection . . .

Grasses for protection of roadsides, for dependable grazing, for control of beach sands, for filtering wastes to protect water quality . . .

Shrubs for wildlife food and habitat, and for special jobs in erosion control . . .

In the course of it all, observation and lengthening experience of the Soil Conservation Service and cooperating agencies have brought new techniques for planting, cultivation, and greater usefulness.

By matching our mounting knowledge of

soils with the needs and performance of plants, we have built a valuable fund of resource information. For special duty in a salty expanse in the Southwest, for controlling active dunes around the Great Lakes, for improving the tilth of a depleted soil in the Southeast, SCS conservationists can offer the kind of plants needed, information on getting a stand, required care and maintenance, and even instructions for harvesting seed.

It has been a vital part of our work to amass materials and knowledge through our plant materials centers and to keep them readily available. It has been an important role of local conservation districts to aid in both collecting and applying the materials and knowledge.

In recent decades, development of huge machinery for reshaping the earth's surface has made services of the trained conservationist a matter of even greater urgency. The need for quick-growing plants to hold the soil of a housing development, an airport, or a new highway during the months of construction has placed demands of a new and broader dimension upon him. His knowledge of the usefulness of certain plants for special jobs, in particular soils, and of the care and feeding required has stood the test. Yet he must constantly seek to learn more.

Even the man or woman troubled by sensitivity to the pollen or presence of certain plants may have cause to thank the conservationist for a degree of relief. Conservation plantings tend to crowd out unwanted species and keep them out.

The world of plants is an exciting one and through the conservationist a source of better things for mankind.

Kenneth E. Grant

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A home in the woods

The Allen Carlsmiths of near Amherst in New Hampshire are very close to their goal—home as near to nature as they could have it.

They chose the hillside site on a 60-acre tract of mostly woodland and designed the building to blend in subdued harmony with the land-scape. In the dining room you have the feeling of still being outdoors with bird and animal neighbors a nodding distance away.

As Mrs. Carlsmith explained it, she and her husband have tried to become a part of the natural setting rather than to change it.

The Carlsmiths have been work-

ing on their project for years, but only recently discovered the assistance available through the Hillsborough County Conservation District. They have become district cooperators and are going about their planning with technical help of the Soil Conservation Service.

The plan calls for a nature trail leading from the house, past a pond, and back. The sight of deer in the horse pasture is a recurring thrill, and excitement attends the furtive visits of squirrels, raccoons, and chipmunks.

Mountain laurel decks the hillside in splendor in June. And Mrs. Carlsmith delights in the wintergreen smell of the black birch, the irregular branching of the oaks, and in the dramatic patterns of the white birch with its papery bark.

The tract was logged a generation back, but not severely. Some of the larger trees remained. Carlsmith removed some selected trees to permit fuller development of the laurel and to allow more sunlight in the home. He and Mrs. Carlsmith are not interested in selling wood products, although they know that as long as the trees grow they are producing wood.

Future generations may need to harvest some of the wood. For the present tenants, the Carlsmiths, the enjoyment of living in the woods is far more important.—ROBERT E. GREENLAW AND MORSE L. BROWN, woodland conservationist, SCS, Durham, and soil conservationist, SCS, Milford, N.H.



To help fit her home into the natural landscape, Mrs. Carlsmith made the conservation plan she is discussing with Morse Brown of SCS.

© conservation





November 1970, Vol 36, No. 4

Youth in action . . .

As a followup to last August's articles about outdoor classrooms for conservation learning at first hand, this month's lineup features young people who learn by doing something in the world of conservation.

The lead article (p. 75) describes how city elementary school children in Texas build erosion-control structures, take soil samples, make weather forecasts, and do other chores at a 300-acre camp.

In other articles, young people in organized groups make a meaningful contribution:

Vocational agriculture students

(p. 77)

American Indian students (p. 78) Girl Scouts (p. 79) and Boy Scouts (p. 80)

Job Corps (p. 81)

Neighborhood Youth Corps (p. 83)

and church fellowship members (p. 84)

As always, SCS is up to other things besides what our magazine theme happens to be. We help the city of Denver match water supplies wth need (p. 82); migrant farmers in Texas get more of their water to thirsty crops (p. 86); and Wisconsin residents find outdoor fun at a watershed lake (p. 96).

COVER: Just a rhododendron, but an interesting part of the outdoors for these Vancouver, Wash., students. Their city has an environmental education program.

75 They learn by doing

77 Vo-Ag students plant food for wildlife

78 Too much talk? . . . Call a council

79 Girl Scouts dedicate camp to learning

80 Boy Scout models aid watershed project

81 Job corpsmen learn on conservation farm

82 Denver reaches west for water By Jack N. Washichek

83 Youth power aids stream and road work

84 Working in the world around them

86 Better canals mean more water By Elias J. Guerrero

87 Christmas trees help land and pocketbook

88 Conservation in action

Summer camp, Louisiana; woodland improvement, New York; year-round grazing, Virginia; animal village, New Hampshire; conservation tours, Kansas; plant stories, Arizona; Girl Scout camp, Nebraska; canal restoration, Oregon; cooling pond, New York

91 Windbreaks for ponds

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They'd rather learn by doing it

96 Outdoor fun instead of floods

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

CLIFFORD M. HARDIN, Secretary of Agriculture KENNETH E. GRANT, Administrator, Soil Conservation Service BEN O. OSBORN, Editor GEORGIE A. KELLER, Production Editor

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The sign near the entrance warns, "SLOW—Children at Work."

This is Camp Tyler, a 300-acre outdoor educational laboratory near Tyler, Tex. Here, children from city elementary schools trap gophers, build check dams, make weather forecasts, study erosion and pollution, and learn of their relationship to the environment in ways not possible in a formal classroom.

Camp Tyler serves all of Tyler's 17 elementary schools. Although camp attendance is voluntary, about 95 percent of the eligible children attend. In its 22 years, about 80,000 children have studied at Camp Tyler.

The camp program is an extension of the school curriculum. Much emphasis is placed on the natural sciences. Conservation education is more than a mere part of the curriculum. It is a way of life in which the Conservation Pledge is almost as familiar as the Pledge of Allegiance

On the shores of 2,500-acre Lake Tyler, the camp offers a variety of opportunities for studying the natural environment. Whether in the woods or along the lakeshore, the children are continually learning ecology. While they're learning to bait a hook or to seine minnows for bait, they're also learning something of pond life—what fish to eat, how fish get food, how water quality affects both marine and animal life.

James E. Dudley, director of Camping and Outdoor Education, says, "At Camp Tyler, when studying conservation, we plant trees and grass, or we build check dams. Children learn how to take soil samples, test them, and determine what can be grown in these soils. In studying weather, they learn to use real weather instruments to make weather predictions."

They learn by doing

The children also learn something about forestry and forest management. They learn why trees grow better in one location than in another, and what causes some trees to grow crooked. They discover many kinds and uses of trees and learn how trees conserve soil, water, wildlife, and other resources.

While at camp, the children cut wood, build fires, make beds, mop

floors, dry dishes, and do other jobs. Teacher-counselors skillfully direct both tours and chores to bring out colorful and interesting information about soil, forests, streams and wildlife, and other resources.

The teacher-counselors stress the importance of clean water for homes and industry. The class then visits the city water-pump station and discusses what happens to the water



Classroom Teacher Thorndike Lewis works with his students to rid Camp Tyler of animal pests.

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from the time it leaves Lake Tyler until it reaches the taps in their homes. A visit to the camp's blacksmith shop turns into a discussion of the types of fuels used, which ones burn clean, and which contribute to air pollution.

"We are trying to teach the kids of today not to make the mistakes we did in managing the environment," Dudley said.

Camp Tyler was conceived in 1945 when the Tyler Kiwanis Club began work on plans for a summer camp for Campfire Girls. Dr. Mortimer Brown, superintendent of schools, was concerned about public apathy toward the deteriorating environment. He became interested in the school-camping movement and began to envision the camp as a year-round facility. The Tyler

Board of Education suggested that the camp be operated by the public schools as an outdoor laboratory during the school year and a recreational camp during summer months.

The project drew prompt community interest and support, and plans were soon broadened to serve all the camping agencies and service clubs within the community.

The Smith County Youth Foundation established to raise funds for the camp solicited help from specialists in planning the camp's physical layout. The camp was designed for program work. Laymen, educators, consultants, local firms, state and federal agencies, and individuals contributed time, talent, elbow grease, and money.

The Soil Conservation Service helped with drainage, terraces, di-

versions, tree planting, grass management, and other conservation measures. Further help was provided by the National Park Service, Fish and Wildlife Service, and the Forest Service.

Teachers and students from kindergarten through the fourth grade use the camp as a base for day-long field trips. Originally, fifth and sixth grade students and teachers lived at the camp for a week, but steadily increasing enrollment eventually forced curtailment of camp residence to 2 or 3 days. Certain days during the school year are also reserved for special education classes for physically or mentally handicapped children.

In 1950, a 150-acre one-family school farm was opened on property adjacent to the camp to provide realistic farm experience for Tyler children. SCS conservationists helped draw up a farm plan and devise a balanced farm program with dairying as the major operation.

A resident farm operator, under the direction of the supervisor of vocational agriculture, is in charge of the farm program. The "farmers" are high school boys enrolled in vocational agriculture courses. Each helps on the farm, too, and a high point of their stay is gathering eggs laid by the farm's 400 hens.

Camp Tyler has excited the interest of educators all over the United States and as far away as Australia. Thousands of visitors have toured the camp, and Director Dudley receives 300 to 400 letters of inquiry each year.

The camp's friends are now seeking ways to provide more time at camp for the kids. A committee is searching for a site to be used as a second Camp Tyler.—GLORIA E. McDavid, formerly information specialist, SCS, Ft. Worth, Tex.



Camp Tyler Director Jim Dudley watches as Teacher-Counselor Meredith Haynes teaches a class in pond ecology. (The girls think they're only learning how to fish.)

Vo-Ag students plant food for wildlife

Sportsmen, community businessmen, high-school agriculture students, and a forest industry have given a timely boost to the wildlife and the economy of a section of West Virginia.

Their efforts—in the form of plantings of food for deer, turkey, and grouse—were channeled through the Little Kanawha Resource Conservation and Development Project.

The plantings are in the Hughes River Public Hunting Area, established in 1963 under joint management of the West Virginia Department of Natural Resources and the Timberlands Division of the Westvaco Corporation.

Wood, water, wildlife, and recreation are the products of Westvaco's forest land, company officials say, and it is the responsibility of management to provide for all four. Hunting is by permit with payment of a small fee.

The Soil Conservation Service worked with the RC&D Project's wildlife and recreation committee on arrangements for the plantings. Ken Greene, a Parkersburg businessman, as chairman of the committee, helped to stimulate interest. Joe Collins, woodlands manager for the timber firm, helped by selecting planting sites and providing equipment.

Increased use of hunting opportunities in the area, the committee said, would contribute to the economy of the community. Hunters would be attracted from Ohio as well as West Virginia.

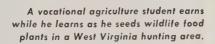
Local businessmen, individuals, and sportsmen's groups agreed to underwrite the cost of the effort. The committee estimated that each half-acre planting would mean an outlay of about \$30 for seed, fer-

tilizer, and labor. The company would clear and prepare the planting sites.

The Wirt County vocational agriculture teacher, Phil Winters, sensed an educational opportunity for his students in the project. He organized 20 of them into a crew to study the project plans, buy materials, and do the plantings.

By late summer eight sites had been planted to millet, sorghum, soybeans, and buckwheat.

As the hunting season opened, the success of the project was readily evident, and the committee began work on plans for expanding the program next season.—ED W. GASKINS AND D. J. COLLINS, area wildlife biologist, SCS, and woodlands manager, Westvaco Corporation, Parkersburg, W. Va.





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Too much talk?... Call a council

It was a communications challenge, and for a time it appeared the effort was on the wrong wavelength.

On the receiving end were 300 young representatives of major Indian tribes. They had gathered at Camp Asaayi, N. Mex., at the Environmental Education Encampment sponsored by the Boy Scouts of America and the U.S. Department of the Interior's Bureau of Indian Affairs,

When they finished the course, they would return to their people—it was hoped—and assume leadership in environmental education work.

The instructors—with the job of communicating — were—specialists in various techniques of managing the environment. They included nine Soil Conservation Service conservationists. Fifteen stations were set up, at which each of 15 groups would spend a few hours in listening and learning.

But, after the first afternoon, it was evident that the lines of transmission were not open. No questions, no participation. Only stony countenances. The message obviously was at best faint and unclear.

There was need for a council.

Otis O. Fuller, coordinator of American Indian relationships for the Boy Scouts, opened the discussion. Each group of young men was represented. The representative was asked to speak. The "feedback" was loud and clear—some sessions had been too technical . . . too much lecturing.

A quick revamping of the procedure was in order. Classes scheduled for 3 to 4 hours were shortened to 2 hours. Class time was, for the most part, converted from lectures to participation by the students.

SCS Soil Scientist George Anderson had a "treasure hunt." The young men scattered as the class opened, to find and bring back one object in the vicinity. The "treasures" were sorted into piles.

By separating rocks from wood, white rocks from black rocks, large rocks from small ones, Anderson showed how a classification of soils or plants is done.

The class went to a nearby gully to see the soil strata and used hand





Boys at Camp Asaayi measure range vegetation with Ron Julian (above left), and show their interest in falcons with Morlan Nelson (below left).

levels to survey a contour line across a hillside. A walk around the camp was an opportunity to identify gullies and to discuss causes and needed conservation work.

The range planning station offered a learning experience for the instructors. As plants were identified, the students described how their parents and ancestors used them. The instructors learned which plants had medicinal value, which were food, and which were used for seasoning or other purposes.

At the "Man and His Environment" station, Ron Batchelor, Arizona state biologist, and his fellow instructors asked each class member to draw on paper the kind of place in which he would like to

Later discussions of the drawings and the reasoning behind them made it easy for the instructors to point out why one type of environment was preferable to another and why conservation of the environment is a critical need no matter where you live.

Trained eagles, falcons, and owls brought to the encampment and demonstrated by SCS Conservationist Morlan Nelson also proved effective in shortening the first-day communications gap. The demonstration encouraged lively discussion of the interrelationship of resources and the need for man to recognize the value of all species. With a golden eagle in view, the ancient mythology and symbolism surrounding the great eagle took on a new meaning among the young Indian men.

By encampment's end, the lesson in communication was clear, and it was agreed that the environment is a fascinating subject when student and instructor together can talk of the marvels of the world around us.—NEIL SAMPSON, information specialist, SCS, Boise, Idaho.

A place to know nature . . .

Girl Scouts dedicate camp to learning

R ancho del Chaparral in northern New Mexico is 1.200 acres of pines and spruce, streams and canyons—and scores of other outdoor wonders to see and hear and touch.

The Rancho is dedicated to the experiences of youth in the world of nature. Through the summer its trails resound with the excited voices of hundreds of Girls Scouts.

Here girls experience the soft fragrance rising from a pine needle carpet, the taste of pure spring water. Here they learn the value of soil, water, forest, and wildlife in their lives and how to live in harmony with nature and their fellow human beings.

Work to turn the Rancho into an

exciting learning experience for thousands of future campers began in 1965 shortly after the ranch was acquired by the Chaparral Scout Council. In July 1969 the camp was



dedicated with 1,930 young campers on hand for the first season.

The council entered into a cooperative agreement with the Jemez Soil and Water Conservation District, and with the help of the Soil Conservation Service and other agencies developed a long-range resource conservation plan for the area. The Forest Service, Bureau of Sport Fisheries and Wildlife, and New Mexico Department of Game and Fish played important roles in this conservation planning.



Senior Girl Scouts surveying for stabilization work on lagoon bank.

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To get needed conservation measures applied without delay, the council arranged with SCS—under a salary cost-sharing agreement—to have Charles Sundt, a full-time SCS professional at Bernalillo, spend 9 weeks at the camp in the 1970 season.

With much of the actual work being done by the Scouts, several parts of the conservation plan were completed this summer.

Under Sundt's guidance a mile in the system of trails was mapped, cleared, graded, and stabilized to prevent erosion.

A Forest Service team from the Cuba Ranger District planted a 3-acre observation plot to Ponderosa pine. SCS and the council cooperated in providing trees and grass for stabilizing a bank along the sewage lagoon. The New Mexico State Department of Forestry con-

tributed a four-wheel-drive vehicle for fire control. The Bureau of Sport Fisheries and Wildlife furnished the designs for ponding the structures for the fishing habitat in the Rio de las Vacas that flows through the Rancho. The New Mexico Department of Game and Fish provided technical supervision during construction. The stream is to be stocked with fish by the Bureau of Sport Fisheries and Wildlife.

In addition to supervising conservation work, Sundt also provided instruction in resource conservation to the campers. The girls learned to identify many of the plants and to know the value of a watershed. And above all, they began acquiring an appreciation for the unforgettable wonders of the outdoors.—DICK BARBER, district conservationist, SCS, Bernalillo, N. Mex.

Boy Scout models aid watershed project

Steven Cronin lives in Harvard, Mass., one of four communities awaiting completion of the De-



laney Reservoir for flood prevention and wildlife development.

As a Boy Scout, Steven has been interested in the entire SuAsCo Watershed Project that will benefit his area.

Development of the Delaney site will provide a 160-acre permanent pool for resting and nesting ducks, chain pickerel, and pan fish. In times of flood-producing rains, the

Steve Cronin exhibits his model of a Public Law 566 watershed project. Frances Sherburne, chairman, Middlesex District (left) and Boy Scout from Lexington Minute Man Troop review model of Nashoba Watershed Project. reservoir will hold back 3,500 acrefect of water for controlled release.

Using construction drawings, topographic maps, aerial photographs, and field studies. Steven fashioned a scale model of the Delaney complex. The model includes homes, industry, vegetation, and water with the proposed engineering works.

The Middlesex and Northeastern Worcester County conservation districts, Massachusetts Water Resources Commission, Division of Fisheries and Game, and Department of Natural Resources sponsored the watershed work under provisions of Public Law 566 administered by the Soil Conservation Service.

Steven's model, which has been on display in the office of the Water Resources Commission, has helped to provide information for citizens of the area concerning plans for the development. Steven says the work he has done has helped him to understand the relationship of man to the environment.

The Senior Patrol of Troop 193 in Lexington used a similar technique to explain features of the proposed recreational reservoir on Nashoba Brook, which also is a part of the SuAsCo Watershed Project. SCS provided technical information and the Middlesex District provided modest funding for the project.

The Scouts worked on a model for a Scouting Exposition visited by 25,000 persons. They received a blue ribbon for their efforts. Featured was a cross-section of dam and water-control structure showing the principal spillway, antiseep collars, core, antivortex device, and emergency spillway.

The work of Steven Cronin and the members of Troop 193's Senior Patrol is typical of the work Boy Scouts are doing and can do in helping communities understand the purposes of resource conservation.

—ROBERT N. MOREHOUSE, district conservationist, SCS, Acton, Mass.

Job corpsmen learn on conservation farm

The crops this year on the Steed farm near Syracuse in Davis County, Utah, were corn and potatoes as usual. But there was another important yield. Young men on Steed's farm are learning conservation principles along with other farming skills. And Joseph Steed is getting his conservation farm plan applied. The farm has been in the Steed family for more than a hundred years.

Steed, a cooperator with the Davis Soil Conservation District, was going ahead with his conservation farm plan, but he was having trouble finding enough money to make the kind of progress he hoped for.

In 1965 the contractor for the

Clearfield Job Corps Center was looking for a farm where underprivileged young men would learn modern farming methods. Steed's 200-acre place, it developed, was what was needed. Steed had 80 acres of irrigated cropland. The rest of the farm was native meadow.

The center leased Steed's land and arranged to furnish labor and equipment to raise crops, build corrals and buildings, and install the remainder of the practices in Steed's conservation plan. The center hired Steed to help with irrigation and to care for the livestock on weekends and holidays.

About 65 boys are enrolled in the farm program, in groups of 30 to 35. Each group works every

other week on the farm. The boys attend classes in alternate weeks, receiving instruction in basic subjects.

On the farm the boys work in groups of four or five with one of their number a leader who acts as foreman for a certain job or piece of equipment. Farm instructors are Robert Litchfield and Robert J. Bingham, both practical men with long experience in farm and building work.

Potatoes produced on the farm this year are used in the center's kitchen. The corn is put up as silage and fed to the steer herd.

With technical help from the Soil Conservation Service and costsharing through the Agricultural Stabilization and Conservation Service, corpsmen have improved irrigation on 5 acres, installed a mile of concrete irrigation ditch and a quarter mile of pipe, and built 50 water-control structures.

SCS specialists, while surveying the ditch work and supervising the land leveling, showed the corpsmen how to use the instruments and explained the conservation work.— EARL SPENDLOVE, district conservationist, SCS, Layton, Utah.



Robert J. Bingham, Job Corps instructor, tells William Brown (right) and Joe Luvis Peavey III how land leveling is done.



From the mountain . . .

Denver reaches west for water

By Jack N. Washichek
Snow survey supervisor, SCS, Ft. Collins, Colo.

R ub out the mountain snows and you can color Colorado's "Mile High City," Denver, a dull brown.

Denver is in a semiarid region and depends for its water supply on snowmelt runoff from the mountains to the west.

Precipitation in the growing season is about 9 inches. But about 20 percent of the time it is less than $6\frac{1}{2}$ inches.

Skillful management is needed to provide adequate water for the Denver metropolitan area.

Most of the moisture brought into Colorado from the Pacific is deposited as snow west of the Continental Divide. The bulk of this water normally flows into the Colorado River system, which takes it southwesterly to the Gulf of California.

Since Colorado's major population centers are east of the divide, it has been necessary to undertake projects known as trans-mountain diversions to take this water to the area of greatest need.

The South Platte, an eastern

slope river, provides about 40 percent of the water requirements. Major flow usually occurs in early summer months. Many reservoirs are required to trap early water for use during the rest of the year.



Eleven Mile Reservoir contains 97,779 acre-feet and is fed by the South Platte River. Antero and Cheesman reservoirs also derive their water from the South Platte and have a combined storage of almost 95,000 acre-feet.

Dillion Reservoir lies west of the Continental Divide and is the largest in the system, containing 254,-036 acre-feet when full. It lies at an elevation of 9,200 feet. This reservoir is 60 miles west of Denver on the Blue River, a tributary of the Colorado. Other west-slope supplies are derived from collection systems on the Williams Fork and Frazer rivers and stored in the 43,-000 acre-foot Gross Reservoir on the Eastern Slope.

Water is transported from these collection systems and reservoirs as needed to smaller terminal reservoirs located near the city. The Denver Water Board, which provides water to nearly 750,000 persons and thousands of businesses in the Denver metropolitan area, must be continuously aware of the potential water supplies.

The snow-survey program of the Soil Conservation Service plays an important part in the management of these facilities. Two Denver Water Board employees read five snow courses, and SCS supplies data on 39 others to provide a constant vigil on this important resource.

Data from these snow courses are compared to data from previous years. This is an index forecast method. The amount of runoff is estimated from past streamflow records and snow pack. This provides the Denver Water Board with a good idea of how much water it can expect in a given year. Will this year's streamflow be adequate or will some water previously stored

SCS snow surveyors (above left) use a special tube to measure snow depth and moisture content. Their data help in regulating the reservoirs such as Williams Fork (left) to assure Denver enough water.

in the reservoirs be needed to supply demands? If streamflow is expected to be much below normal, direct flow from the streams will not supply all demands. Water must be moved from high reservoirs to lower ones, in readiness for anticipated demands.

Management must look at current storage and potential runoff and decide the best short- and longrange procedures to follow. If there is a large carryover from the previous year the decisions are relatively simple. If storage is low, then management must determine which reservoirs should store, and when, as well as which reservoirs should be depleted, and to what extent. There will be no new water supplies until next spring. SCS snowcourse data are an invaluable management tool in making these decisions.

As population expands and more industry moves into the Denver area, more frequent checks on the snowpack will be necessary. Continuous checks will enable the Denver Water Board to:

- Start movement of water at the earliest possible time.
- Make better forecasts, because peak of snowpack will be known instead of only April or May 1 measurements.
- Be constantly alert as to how much snow has melted and how much remains during the spring melt.

Even with snowpacks equaling the historical average every year this resource will not be able to provide water for the projected population much beyond the year 2000. Several alternatives exist. Among those being studied are re-use of sewage effluent, weather modification, and water from other areas outside the Colorado area, such as the Missouri River Basin, Each would be quite expensive. The Denver Water Board continues its quest, with help from SCS snow surveys, to meet current and future water needs of the "Queen City of the Plains." ♦

Youth power aids stream and road work

Two detachments of the Neighborhood Youth Corps merit thanks for much of the seedbed preparation, seeding, and mulching along roadsides and streambanks in the Tioga County Soil and Water Conservation District in New York. The youths were employed under the Tioga Opportunities Program, Office of Economic Opportunity.

The district employed 17 NYC youths for work on two measures in the South Central New York Resource Conservation and Development Project. Eleven worked on highway improvement and beautification. Six worked on streams to improve fish and wildlife values along the West Branch of Owego Creek, rated the county's best with a potential for trout.

All townships in the county contributed to the roadbank program. RC&D Project sponsors made funds available for seed, lime, fertilizer, mulch, and netting. The district was the prime contractor.

The road embankment work has established an excellent demonstration of stabilization and beautification. Roads were being improved in the county at the rate of 20 miles a year with most needing stabilization of the banks. The road embankment looks good. Maintenance costs will be reduced with offsite siltation damage reduced.

In the stream-improvement program the youths built four types of structures designed to control erosion and improve fish and wildlife habitat.

The stream-improvement plan includes land treatment and fencing of the channel where needed. The New York Department of Environmental Conservation is supplying logs, wire, spikes, and other materials. A district employee supervises the work. The district is looking at other streams for similar improvement.—LLOYD E. WRIGHT, district conservationist, SCS, Owego, N.Y.

Working in the world around them

Concern for the world around them is nothing new to the Senior High Fellowship students from the Kirk of the Hills Presbyterian Church in Tulsa, Okla.

For 51 weeks the students work at various jobs in their own community earning enough money for another week of work and study someplace in the United States during the summer.

Last summer their destination was the Burnamwood Presbyterian Camp near Irvine, Ky., a 450-acre camp serving more than 15,000 people in 150 Presbyterian churches in central and eastern Kentucky. Their work for the week involved them in forestry, engineering, beautification, and conservation as they created a workshop amphitheater in the heavily wooded hills comprising the camp.

Burnamwood is being developed as the major camping and outdoor center in Kentucky for the two denominations which own and operate it—the United Presbyterian Church in the United States of America and the Presbyterian Church in the United States.

Only about 15 acres of the camp will be developed with permanent facilities such as a swimming pool and lodges for year-round meetings and camping.



Young hands and minds work hard to learn about and improve on the natural world at Camp Burnamwood.





The remaining 435 acres will be left in woods with only primitive campsites and hiking trails exposing future campers to the solitude and beauty of the surrounding hills.

Guidance for laying out the trails, selecting primitive campsites, and for seeding and erosion problems, as well as the design for a new dam that has just been completed, is being provided by the Soil Conservation Service. And volunteer help such as the Kirk of the Hills students is providing most of the work force.

In the week following their arrival, the students found themselves involved in not only hard physical work but also in some difficult mental exercises as well.

What was the best site for the new worship center? How could the amphitheater be constructed to fit into the natural surroundings? How could erosion be prevented along the path to the theater? What trees could be cut without damaging the woods or creating erosion problems?

Some of the decisions were made with the help of SCS personnel and the camp director, Rev. Kenneth D. MacHarg. The site selected for the amphitheater was on the side of a hill overlooking the lake just beginning to fill with water behind the

new dam. The path from the major cabin area would run across the top of the dam, up a steep bank, and then through a heavily wooded area along the side of the hill.

Using the trees cut in the clearing operation, the students trimmed, cut, banked, and staked the logs into the heavy mulch covering the area, forming two seating-sections of five rows each. A waist high stump of one tree was left to serve as a pulpit.

When more logs were needed, the students selected and cut several trees on the peninsula jutting out into the new lake. These logs had to be trimmed, rolled down a steep bank, floated across a stream, and hauled up another steep bank. Much to the dismay of the junior lumberjacks, two of their hard earned logs mired in the mud along the bank of the stream and sank in waist-deep water.

During the logging operation, another section of the crew was busy on the trail leading to the amphitheater. To prevent erosion on the steep bank and along the hillside path, the students constructed and packed log steps in the side of the bank and then cut, packed, and mulched a foot trail through the woods.

Although the scheduled study tour of the Appalachias was still ahead of them when the students left on Saturday, they had already learned a great deal about man's relationship to his environment.—

JANICE L. CURTIS, SCS, Information Division, Washington, D.C.

Better canals mean more water

By Elias J. Guerrero
District conservationist, SCS, Rio Grande City, Tex.

Below Falcon Dam, where the Rio Grande continues on its way to the Gulf of Mexico, the river is a source of water to nourish and refresh the crops of Reynaldo Barrera and his 26 neighbors who make up the Fronton Irrigation Cooperative.

The members of the cooperative, all Mexican-Americans, are allotted 1.5 acre-feet a year from the Rio for each of the 575 acres of the cooperative.

If a third of that water is lost to seepage from unlined irrigation canals, it can make quite a difference in income—an income which would be modest even under the best conditions.

This was happening, and that is why the Fronton Cooperative sent Barrera to ask the Starr County Soil and Water Conservation District directors what might be done. The inquiry was timely, since the district and the Soil Conservation Service are working toward a Resource Conservation and Development Project in the Rio Bravo area.

The Fronton Cooperative came into being in 1939, when Barrera's father and 17 other farmers joined to buy an irrigation pump and build the water-delivery system. With mules and fresno scrapers and much exhausting labor they fashioned the canals and the numerous distribution boxes.

Most of the members are among the migrant Mexican-Americans who trek north each year following the harvesting of crops. In the spring, they usually prepare their land, plant their crops, then leave with the entire family—assigning one person to stay and take care of their belongings. They return in November. The average family income is about \$4,500 a year.

The water pumped from the Rio Grande below Falcon Dam is under the jurisdiction of the 93d. District Court at Edinburg, Tex. The distribution is handled by a special watermaster appointed by the court. To the Fronton Cooperative mem-

Reynaldo Barrera, president of the cooperative, at a main distribution box that his father and other farmers built by hand.

Water flows down the canals built with mule-power long ago, but a third of it fails to arrive at the fields of the Fronton Cooperative. bers every drop of their 863 acrefeet of water is important.

A survey by SCS engineers showed that 30 percent of the water pumped for the cooperative's use was being lost to seepage from the main canals. This meant an annual loss to the cooperative of about 260 acre-feet which at a value of \$15 an acre-foot adds up to an annual loss of \$3,870.

A Resource Conservation and Development area proposal was signed asking help to line the main canals with concrete and build new distribution boxes, a job that SCS estimates will cost about \$35,000.





The Starr County Agricultural Stabilization and Conservation Committee was asked for help through its Special Projects program. The cooperative members may get as much as 80 percent in Federal cost-sharing.

County Commissioner Amando Pena, aware of the financial plight of the cooperative members, has persuaded the Starr County Commissioners Court to agree to pay the difference between the total cost and the Federal cost-share.

Members of the Fronton Cooperative are looking forward with satisfaction to being able to use more of their water supply. ◆

Christmas trees help land and pocketbook

Conservation of the land they farm is the principal interest of Harold and Betty Baker of Kirksville, Mo. Raising Christmas trees comes in second.

They started with 90 acres in 1954. Erosion had taken a severe toll. Baker planted Christmas trees on an old field in 1959 as an erosion-control measure. The crop proved successful in two ways—controlling erosion and producing a profit.

Baker added 290 acres to the operation and planted 94,000 trees in all. He will use as much of the entire acreage as he can for Christmas trees and let wildlife enjoy the rest.

It is a matter of pride with Baker that the look of the land in its present use is much different from its condition when he became its steward. Sound conservation protects all areas. Natural drainageways are in native shrubs and trees; areas not suitable for Christmas trees are in wildlife food plots, and the fishing lake, built with the help of the Soil Conservation Service and the Missouri Department of Conservation, is properly stocked.

Baker, cooperator with the Adair County Soil and Water Conversation District, plants trees in grass sod. He found that disking of the site before planting had resulted in the loss of too many seedlings. In the first and second years of tree growth, Baker reduces competition from weeds and grasses with tractor-powered mowers.

The third year a shearing crew directed by Mrs. Baker moves in. Crew members are high-school students who shape the trees to please choosy buyers. Shearing continues each year. Before cutting in the fall, each tree marked for harvest gets a spray coat of green to help nature's paintbrush.

In late November, Holiday Tree Farms become a hive of activity. Baker harvests only a small number of trees for people who do not wish to cut their own trees. Most sales are to customers—many of whom bring the whole family—who select and cut their own trees. This "choose and cut" system has become profitable and popular.

Since 1967 the Bakers have been realizing a satisfactory income from their tree plantings. But satisfaction comes, too, from the conservation work they have done and from the abundant wildlife on their farm.

Professional conservationists regard the Baker operation as an outstanding example for landowners in northeastern Missouri.—John W. Manary and Francis T. Holt, district conservationist, SCS, Kirksville, Mo., and woodland conservationist, SCS, Columbia, Mo. ◆



Betty Baker shows the fine art of shaping

Conservation comes to summer camp

Louisiana

Directors of Louisiana's 75 or more summer camps for boys and girls are putting resource conservation at the top of their list of essential things to be done.

To have a successful camp—a place where youngsters get to know the place that soil, water, and plants occupy in their lives—the camp's resources must have conservation care, most directors say.

The Louisiana Baptist camp, built 10 years ago, had water-management problems. Roger "Jiggs" McCoy, director of the camp, in carrying out a conservation plan, provided for disposal of the water standing in low areas. On eroding places he seeded grass or lined the areas with concrete.

The plan also called for a milelong nature trail through the 50 acres of timber. The 300 young people attending each camp session get close to outdoor life along the trail, stopping at points to study plants, trees, and the world of water.

M. F. Peters, manager of the Episcopal state camp in central Louisiana, is a cooperator—like other directors—with his soil and water conservation district. SCS specialists assigned to the district helped design and install a system to slow runoff from the camp and lead it into a grassed waterway.

Peters' plan included a series of nature trails that more than 1,000 young campers follow each summer. A night in the woods is part of the camp program.

The state camp of the Church of God manages 30 of its 50 acres for pine production. A first step in the camp's development was a conservation camp plan by Director Clayton Perry with help from SCS District Conservationist Jesse Goss.

The plan calls for cutting timber every 5 years and for erosion control on roadbanks.

Lecturing and guiding young campers in conservation work is a periodic assignment for SCS conservationists in Louisiana. They teach conservation principles to more than 10,000 Boy Scouts and Girl Scouts and other groups in a year. The youth work on conservation jobs as a part of their camp experience.—Gene Warren, information specialist, SCS, Alexandria, La.

New York

Youth corps aids woodland owners

A conservation district in New York State is offering its cooperators a new service—woodland improvement that includes pruning, thinning, and cull removal.

Thousands of acres of cutover woodlands and abandoned farmland being returned to woodland needed treatment. Less desirable species were crowding out valuable hard maple, yellow birch, and black cherry. Owners were interested in conservation management, but few could do the job without help.

In 1967 the Franklin County Soil and Water Conservation District hired a foreman to direct a group of Neighborhood Youth Corps boys. That year they improved 84 acres. The following year they worked on 241 acres and planted 250,000 trees. And in 1969, they improved 350 acres and planted 294,000 trees. Plans are to raise the 1970 goal of the woodland crew to 500 acres of woodland improvement and the planting of 350,000 trees.

State foresters say that cooperators receive a quality job from the district crew. Woodland management work also makes it possible to harvest sawlogs many years earlier than otherwise would be the case.

Agencies contributing to the success of the work are the New York State Environmental Conservation Department, Agricultural Stabilization and Conservation Service, Neighborhood Youth Corps, and the Soil Conservation Service.—Kenneth C. Cobb, soil conservation technician, SCS, Malone, N.Y.

Virginia

All-year grazing lowers labor costs

William T. Barnes III, who farms near Blackstone in the Piedmont Soil and Water Conservation District of Virginia, manages his pastures for year-round grazing. It has reduced his labor needs by 80 percent, he believes.

Barnes has revised his conservation farm plan many times. He prepared his present plan with the help of Pat Trew, Soil Conservation Service grassland conservationist.

"I used to work full time on the farm and use one full-time man to help," Barnes recalled. "Now I use

Tommie Barnes notes the thick growth of fescue in one of his well-managed winter pastures.





Village resident and friend.

a little part-time labor and have a part-time job that keeps me away from the farm more than half the time. I make more money than ever."

Barnes says advantages of his present grazing plan include less disease, heavier calves, lower costs, and less supplemental feeding. Profits have gone up because it costs less to keep a cow for a year.

In past years tobacco, corn, and small grain were the crops on the Barnes land. Terracing, needed then, no longer is required. Barnes' good stand of pasture grasses does a good job of controlling erosion.

Barnes' management is aimed at producing grass ahead of the time his cows need it. He grazes 125 cows on 336 acres. The herd is about half Angus and half Hereford.

Barnes has 212 acres of tall fescue, 40 acres of orchardgrass, and 84 acres of common bermudagrass. He manages about 120 acres of the fescue for winter and early summer grazing. The remainder of the fescue is used in spring and fall. The orchardgrass is cut in the spring for hay and is grazed in the fall. The bermuda furnishes summer grazing.

Barnes is a believer in soil testing. Phosphate and potash are applied to all pastures according to a test. Nitrogen is applied to produce growth at the desired time. The winter pastures get 70 to 80 pounds of nitrogen in early August. Cows are moved off and growth accumulates until late November or December. Spring and fall grazed pastures get about 50 pounds of nitrogen in August. Orchardgrass gets about 80 pounds of extra nitrogen in the spring to insure a good cutting of hay. Bermuda will get about 40 pounds of nitrogen in late April and 40 pounds more in July if needed.

Cattle are moved when grasses are grazed to an average height of 3 inches. Grazed pastures are rested to accumulate growth for the next period of grazing.—WILLIE B. IRBY, district conservationist, SCS, Nottoway, Va.

New Hampshire Animal 'village' opens for business

Tilton's Animal Village is the name on the sign. The "villagers" are lambs, calves, ducklings, pigs, goats, donkeys, cows, and other friendly animals.

The Charles Tiltons, cooperators with the Belknap Conservation District in New Hampshire, considered other uses for their 26 acres in the heart of the Lake Winnipesaukee recreation complex. Developing the land for camping would be too expensive. Other possibilities, including fee fishing, had little appeal.

The animal village idea, which would include an outlet for Mr. Tilton's woodworking products and Mrs. Tilton's jams and jellies, seemed to be the answer.

Into the conservation plan went a pond, a nature trail, and the improvement of pasture and woodland. A Farmers Home Administration loan financed the making of the small barn into a store and woodworking shop.

Animal tenants came from far and wide, some donated and others bought.

The Tiltons opened on a sunny day in May of this year. As the weeks pass, everything points to success for the unusual enterprise.

—CLEMENT A. LYON, JR., district

conservationist, and Charles S. Brown, state resource conservationist, SCS, Durham, N.H.

Kansas

4-H members lead conservation tours

Conservation tours, with 4-H Club members in leading roles, are proving effective in enabling the Elk County Soil Conservation District in Kansas to deliver its conservation message.

At each tour stop a young 4-H host explains the conservation work in view.

Each year since 1952 the tours have given businessmen, townspeople, and farmers a clearer understanding of the district's conservation objectives. Each tour is on a different theme. Past tours have emphasized such themes as range management, watersheds, woodland management, and land treatment.—GLEN P. SNELL, district conservationist, SCS, Howard, Kans.

Arizona

Stories of plants hold pupils' interest

Carmen Gauman was expressing her appreciation to E. Phil Young, whose delight during the school year is to lead groups of children down the fascinating nature trail at the SCS Plant Materials Center at Tucson, Ariz.

"Dear Mr. Young," the Carrillo School pupil wrote. "Thank you for such wonderful stories. I think you were brave, to put your hand in the doorway of the bees . . ."

Young is field superintendent at the station. He gets scores of appreciative letters like Carmen's during the year following visits by school groups.

Each year a total of about 600 young people, from five to 18 years old, visit the center in groups to walk the nature trail with Young. The trail is through an arboretum planted a quarter-century ago. Native plants grow there with introduced varieties, and Young has an absorbing story about each.

The hive of wild bees, enclosed in glass, is a special attraction for the young visitors. Most children, aware of the reputation of bees, are amazed as Young casually places his hand near the opening of the hive and lets bees crawl over it. But in the plant world, as Young explains, the bees and other insects play a most important role with their pollination services.

Young has more than 25 years of scouting in his career. He is an adviser for Explorer Post 200 of the Catalina Council, Boy Scouts of America.

The Explorer Post has helped repeatedly with conservation projects in the community. On a recently acquired tract they are working on a "conservation showroom" where steps leading to a quality environment will be demonstrated.

Young has been active each year in the Conservation Youth Camp on the San Carlos Apache Reservation at the Point of Pines. He teaches principles of soil and water conservation to the young participants. The Arizona Association of Soil and Water Conservation Districts and the Arizona Extension Service sponsor the camp.

A writer recently referred to Phil Young as a man who thinks young, a faculty he demonstrates each time a group of young guests arrives at the Plant Materials Center.—ROBERT D. SLAYBACK, manager, Plant Materials Center, SCS, Tucson, Ariz.

Nebraska

Great Plains contract helps Girl Scouts

Girl Scouts at Camp We-So-Braska near Nelson, Nebr., will reap the benefit from a Great Plains Conservation Program plan on their land.

The Scouts bought an 80-acre tract with a Great Plains contract on it that lasts until 1972. The Soil Conservation Service, through the Nuckolls County Soil and Water Conservation District, modified the

contract to fit the needs of the new owners.

Contractor Bob Shuck built a pond, prepared the site for the lodge, and improved the road. These were features of the plan of the Nuckolls District. A lumber company added the lodge. Kiwanis and Chamber of Commerce members built a swinging bridge across Elk Creek so the girls could use the city swimming pool nearby. They installed water and power and helped build 15 tent platforms.

The plan calls for converting 55 acres of cropland to native grasses, complete with trails marked to acquaint the girls with grass names. Other areas are set aside for trees.

The dam and work on associated streams are already a study in flood prevention and water management.

Oregon

Farmers and town join to restore canal, dam

A new concrete dam with removable flashboards has restored irrigation water and reduced flooding for a community and surrounding farmland in western Oregon.

The dam replaces an old rock structure built long ago and destroyed by a flood during the Christmas holidays.

The dam and the canal restoration are being financed by a combination of federal and local funds. Nineteen farmers, the city of Brownsville, the Linn County Court, Pacific Power and Light, Linn County Agricultural Stabilization and Conservation Committee, the Linn-Lane Soil and Water Conservation District, and the Soil Conservation Service helped to make the undertaking a reality. It is being carried out as a special Agricultural Conservation Program project.

Cost of the project will total \$34,517: \$24,910 for dam and \$9,607 for restoration of canal, construction of bypass structure, bypass ditch, and drop structures.

Besides restoring irrigation and stock water, the dam and connect-

ing ditches will drain about 100 acres of cropland between the canal and the Calapooya River.

Substituting the removable flash-board structure for the former solid dam will reduce flooding and control erosion on about 250 acres of valuable orchard and cropland. The canal intercepts runoff water from some 1,500 sloping acres.

Since there are few springs or adequate wells around Brownsville, water in the canal is important to wildlife in the area. The canal should provide recreation when restoration is completed.

Canal water irrigates many gardens and yards in town and on farms. This adds to attractiveness of the area.

The project also will provide water for periodically flushing sewerlines in the east edge of Brownsville into the city sewage disposal lagoon. And it will be a source of water for fire protection—something especially important for timberland north of the canal.—RICHARD I. BONN, biologist, SCS, Albany, Oreg.

New York

Fish take the bait to keep water flowing

A record manufacturing company, at Gloversville, N.Y., approached the Fulton County Soil and Water Conservation District with a special problem.

A large pond had been built for cooling purposes in the manufacturing process. Soon afterwards problems developed with the water-intake pipe. The screen kept getting clogged with the remains of frogs and other water life in the pond.

At the recommendation of the SCS district conservationist, the company stocked the pond with several hundred largemouth bass. The bass promptly began clearing the pond of frogs and tadpoles, and the company has had no further problems with its pond water.—ARNOLD FREDERICK, conservation technician, SCS, Johnstown, N.Y.

Windbreaks for ponds

In the Pilger Creek watershed in northeastern Nebraska, the town of Pilger has planted one of the state's first "pond windbreaks."

It consists of a row of Siouxland cottonwoods, backed up by two rows of redcedar and a row of pine along the north and west sides of the 52-acre impoundment.

When the windbreak has reached sufficient height, it will reduce wave action on the pond, make boating and swimming safer, and shelter picnic areas.

Windbreaks have been used for many years in Nebraska to protect homes, farm yards, livestock, roads, and wildlife. Now ponds have been added to the list, a conservation move that stands, Soil Conservation Service conservationists believe, to gain rapidly in popularity. Winds moving across a pond's surface cause wave action which erodes shorelines and the earthfill of dams.

A windbreak will reduce the effect of wind on the water's surface downwind about 10 times the heights of the trees. Cottonwood on such sites can attain 60 feet in height and would have the potential of practi-

cally eliminating waves for 600 feet and of keeping waves to heights of 2 feet or less on water surfaces up to a quarter-mile long.

Trees planted on a lake's shore can produce a relatively calm haven.

The Pilger Lake plans call for family-type recreation areas around the lake on 278 acres the town owns. The town has seeded the land away from the lake to native grasses for erosion control, natural beauty, and wildlife cover.

Game and song birds will find nesting, cover, food, and water in and near the windbreak.

In the three winters since the lake was created as a segment of the Pilger Creek Watershed Project, it has been a popular ice skating spot. Cold winds usually accompany winter temperatures in Nebraska, so the windbreak's winter service will be the sheltering of skaters.

Motor boating is not permitted yet on the lake. SCS District Conservationist Gene Phillips, who is assigned to Stanton County Soil and Water Conservation District, explained that power boats and wind together would add to the maintenance problem. As soon as the windbreak has grown enough to do its work, boats with limited power and speed may be allowed, Phillips thinks.—CLARENCE E. DENNIS, soil mechanics engineer, and JAMES W. CARR, JR., forester, SCS, Lincoln, Nebr. •



Universities to discuss research and extension

The National Association of State Universities and Land-Grant Colleges meets in Washington, D.C., Nov. 8-11.

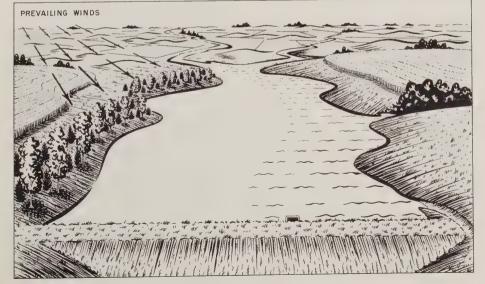
Important sessions will be held on teaching, research, and extension. A few are limited to accredited members of the member institutions, but many sessions are open to all comers. Many of the papers and sessions will be of interest to SCS and other USDA agencies that cooperate regularly with the landgrant universities.

Water Association for better quality of life

"A better quality of life for all Americans through planned resource development" is the program aim of the 39th convention of the National Water Resources Association, November 16 to 20, Las Vegas, Nev. This theme also underlines the association's identification, "water care, to sustain nature and supply man." A tour is planned of the Southern Nevada Water Project, Las Vegas Water District facilities, and Hoover Dam and Lake Mead.

Symposium on irrigation

The American Society of Agricultural Engineers and the Department of Agricultural Engineering of the University of Nebraska are sponsoring a National Irrigation Symposium to be held November 10-13 in Lincoln, Nebr. Cooperating are the American Society of Agronomy, American Society of Civil Engineers, USDA Federal Extension Service, Soil Conservation Society of America, Sprinkler Irrigation Association, and United States Committee on Irrigation, Drainage, and Flood Control.



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Grange highlights rural development

The Nation's oldest farm organization, the National Grange, will hold its 104th annual session in Boise, Idaho, November 9-17. There are 7,000 local Granges throughout 38 states and the Philippines. Discussions will include pesticides, trade, economic development of rural America, family assistance programs, and a "waterway users" tax.

Dates and places

November 5-6, American Forest Institute, Washington, D.C.

5-6, Keep America Beautiful, Inc., New York, N.Y.

8-11, National Association of State Universities and Land Grant Colleges, Washington, D.C.

9-17, National Grange, Boise, Idaho. 10-13, National Irrigation Symposium, Lincoln, Nebr.

10-13, American Association of State Highway Officials, Houston, Tex.

11-13, Geological Society of America, Milwaukee, Wis.

16-20, National Water Resources Association, Las Vegas, Nev. 24-Dec 11, International Commission

on National Parks, New Delhi, India.

27-29, National Association of Farm Broadcasters, Chicago, Ill.

December

1-7, National League of Cities, Atlanta, Ga.

2-4, National Association of Manufacturers, New York, N.Y.

7-11, American Society of Agricul-

tural Engineers, Chicago, Ill. 13-18, 1970 White House Conference

on Children, Washington, D.C. 26-31, American Association for the Advancement of Science, Chicago, Ill.

27-30, American Agricultural Economics Association, Detroit, Mich.



Soil Biology; Reviews of Research. 1969. UNESCO, Paris. 240 pp. (also in French) \$11.00. (Distributed by Unipub, Inc., 650 First Avenue, New York City, N.Y. 10016).

This is an outstanding volume summarizing research related to the microfauna and microflora of the soil and their activities. Five papers make up the book. No index is provided, but the table of contents is very well done.

The first paper, by Pochon, Tardieux, and d'Aguilar, deals for the most part with the techniques used in studying microorganisms. The second, by Mishustin and Shilnikova, deals with the fixation of nitrogen by free-living bacteria, as compared with the symbiotic forms on legumes.

Francis Clark offers the third paper on ecological interrelationships among soil microbes, including predation, parasitism, suppression (unfavorable influences of one organism on the environment of another), competition, symbiosis, and the root zone. The fourth paper is by Mulder, Lie, and Woldendorp on soil fertility, the nitrogen cycle, phosphorus cycle, and trace elements (such as manganese and copper) transformed by microorganisms.

The final article by Alexander discusses pesticides in the soil, what microbes do with them, and their effects on the microfauna and flora. One table in the paper summarizes a large number of studies, showing the length of life in the soil of a large series of pesticides. Those of the chlorinated hydrocarbon group (including dieldrin, chlordane, DDT, heptachlor, toxaphene, and others) remain active for many years, as listed in the table. Another table lists the bacteria, myxomycetes, and fungi known to be active in degrading pesticides. Other tables show the pesticides that inhibit various types of microbes and others that do not.

This work is necessarily highly technical. Names of the authors will be familiar primarily to soil scientists. The five papers are supported by extensive bibliographies. total, the book brings up to date our knowledge in the fields discussed. It is an important reference for soil scientists, and of value as well to ecologists.—WILLIAM R. VAN DERSAL, deputy administrator for management, SCS, Washington, D.C.

Toward Balanced Growth: Quantity with Quality. 1970. Report of the National Goals Research Staff (U.S. Government Printing Office). 228 pp., charts; paper. \$1.50.

"In the next 10 years we shall increase our wealth by 50 percent. The profound question is—does this mean we will be 50 percent richer in a real sense, 50 percent better off, 50 percent happier?" President Nixon asked this valueladen question in his State of the Union message last January, and it aptly applies to the issues raised in this report.

The National Goals Research Staff was established by the President in July 1969. As its first task, it was asked to collect data and prepare an annual report on the possible range of national goals for 1976—the Nation's 200th anniversary—to be used for discussion and as an aid to making intelligent policy decisions.

The first report is centered on the theme of balanced national growth. Six areas of concern or "emerging debates" were selected, and each was discussed in a separate chapter. They are (1) population control and/or redistribution; (2) the environment and its capacity to deal with problems created out of our economic "successes" and affluence; (3) the role of education in a changing complex society; (4) the role of basic natural science in society and its lack of social and

financial support; (5) technology and its undesirable side effects; and (6) the demands for more consumer protection and information because of technology's rapid introduction of numerous complex products.

Basically underlying all these issues is the question of social philosophy—the kind of life style the majority of Americans want, and the price they are willing to pay to have it.

Although the issues actually "emerged" some time ago and there is nothing new in the discussion here, the report has value because of its source, its clarity and organization, and its emphasis on the need for more information to help make intelligent policy choices and to carry them out. The report is most encouraging in that it does indicate there still is time to make choices when so many voices proclaim doomsday on the horizon.—GRACE KRUMWIEDE, Information Division, SCS, Washington, D.C.

Use and Conservation of the Biosphere. 1970. UNESCO, Paris. (Distributed by Unipub, Inc., New York). 272 pp. \$6.00.

As if the state of America's environment weren't already enough to stagger the imagination and drain the Treasury, here's another book of technical papers to remind us that the world pollution situation isn't any brighter. After you get through all the fine print and esoteric language, the results of the Intergovernmental Conference of Experts on the Scientific Basis for Rational Use and Conservation of the Resources of the Biosphere (Sept. 1968) are about as earthshaking as one might expect. The 24 recommendations reiterate our need for more education, more research, more cooperation-more of everything. Intergovernmental, interdisciplinary and interagencythose familiar adjectives—appear frequently.

Subject areas dealt with in detail include: Contemporary scientific concepts relating to the biosphere;

soil fertility; water resources, present and future; conservation's scientific foundation; management of natural vegetation; animal ecology and wildlife management; natural area preservation and protection of endangered species; environmental deterioration; man and his ecosystems (a poignant article by René Dubos, former presidential science adviser); and man's impact on the biosphere (a balanced presentation by F. Fraser Darling, British ecologist).

Intermingled with statistics, ecological concepts, and historical tangents are: Some interesting ways to cope with our predicament (more efficient fish, wildlife, and poultry management; and an "intelligence agency in matters of human ecology"); eye-openers ("the major use of fresh water in advanced countries is for the dilution and transport of wastes."); and some points on which all the conferees agreed (the problems are universally perplexing, entangled and expensive).

When it comes right down to putting money and talent where the mouths are, how much will we give to get a world worth living in or passing on to future residents?—CHARLOTTE R. CONRAD, Information Division, SCS, Washington, D.C.

New publications

An Expanded Great Plains Conservation Program for the 1970's. 1970. USDA PA-960 [6] pp., illus. This folder lists the progress of the program since 1957 and explains that the program now makes additional provisions for: Disposal of animal wastes; developing recreation and fish and wildlife resources; conservation work on nonfarmland adversely affecting a farming area; and promoting the economic use of land.

Also the program places priority on areas subject to severe wind and water erosion and on areas where a change in land use is needed. It provides needed help to groups of farmers and ranchers who are unable to solve unusual conservation problems working separately. It encourages efficient use of water resources but places a practical limit on cost sharing for irrigation improvements and for practices enhancing recreation

and fish and wildlife resources. It encourages the conservation management of range cover and crop residues to reduce erosion, improve the soil, and stabilize the operating unit.

National Patterns of R&D Resources, Funds and Manpower in the United States, 1953-70. 1969. National Science Foundation NSF 69-30. 36 pp., illus. \$0.55. Data obtained show the pattern of utilization of national technical resources, both funds and scientific talent, among the various sectors of the economy. This document is the second report issued. It summarizes the data, and shows historical trends and interrelationships, extends the series through and provides an estimate for 1970.

Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1968, 1969, and 1970, Volume XVIII. 1969. National Science Foundation, NSF 69-31. 280 pp., illus. \$2.50 Based on a survey of Federal departments and agencies to determine the funds they provided or intended to provide in support of scientific activities during fiscal years 1968, 1969, and 1970. It is the 18th report in a continuous series; it provides another increment to the historical perspective of Federal involvement in science and technology.

Solid Waste Processing. 1969. U.S. Dept. Health, Education, and Welfare, Public Health Service. 72 pp., illus. \$0.75. A state-of-the-art report on solid-waste unit operations and processes. A comprehensive reference that includes information on the reliability of processes, performance data, economic factors, and range of commercially available equipment. Prepared as an aid to researchers and others engaged in solid-waste management.

Backpacking in the National Forest Wilderness . . . A Family Adventure. 1969. USDA PA-585. 27 pp., illus. \$0.25. Gives reasons for traveling light, the kind of footgear to wear, equipment needed, and lists sample menus and the wildernesses and primitive areas in the National Forests.

Soil surveys

Safford Area, Arizona. By Frederick W. Gelderman. 1970. 57 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by Frederick W. Gelderman, Paul Winkelaar, J. E. Brown, and Robert T. Meurisse.

McCreary-Whitley Area, Kentucky. By James G. Byrne, Craig K. Losche, Charles R. Gass, G. Dean Bottrell, Peter E. Avers, John K. Long, and Lewis G. Manhart. 1970. 83 pp., illus.; maps 4 inches to the mile (1:15,840).

Recon...

The press has harnessed its power to fight pollution in the Maumee River Basin. After 10 years of editorial page support and concern for the Maumee, the Toledo (Ohio) Blade sent out reporters and hired consultants to document conditions. Their reports and plans led to the formation of Clear Water, Inc., a nonprofit organization to coordinate private and public efforts to clean up the river and its tributaries. Clear Water Administrator Ned Skeldon predicts it will be possible to swim in the Maumee at Toledo within 3 years—"the first major industrial river in the Lake Erie Basin to reach that condition." Swan Creek, once called the "shame of Toledo" by the Blade, now has a small watershed project approved for planning. Clear Water has encouraged local and regional waterpollution abatement programs and updating the state water-resources program.

The cost-benefit ratio of community cleanup campaigns is being boosted by the gradual expansion of manufacturer-sponsored can and bottle reclamation programs. Kaiser Aluminum and Chemical Corporation and the Reynolds Metal Company operate collection centers and pay a small bounty for all-aluminum cans. (The Aluminum Association says that aluminum's recovery value per pound is 10 times that of other packaging materials). There is a similar reclamation program for glass bottles that involved about 100 factories in 25 states. According to the Glass Containers Manufacturers Institute, used glass can be made into new bottles, glass wool insulation, bricks and blocks

of crushed glass, and even "glasphalt" — an experimental road-building material.

If you hear two men discussing the length instead of depth of their wells, chances are they're from Arizona. Horizontal wells drilled into water-bearing strata in that semiarid state are providing livestock water on rangeland. Once developed these "encased springs" (as they are referred to in the July 1970 issue of World Farming) need no power system or pumps. They tap water supplies that might be passed by conventional drilling, and they are both inexpensive and reliable. The two basic geologic formations that yield water for horizontal wells are found in a "substantial portion of the better rangeland in Arizona and other parts of the Western United States."

Our choice—plan or adapt

"Man can achieve some form of tolerance to environmental pollution . . . (which) . . . enables him to overcome effects that are unpleasant or traumatic when first experienced. But in many cases, it is achieved through organic and mental disorders which may result in the chronic and degenerative disorders that so commonly spoil adult life and old age, even in the most prosperous countries . . . Man can also learn to tolerate ugly surroundings, dirty skies, and polluted streams . . . The ultimate result, however, can be and often is an impoverishment of life, a progressive loss of the qualities that we identify with humanness and a weakening of physical and mental sanity." -RENE DUBOS, former presidential science adviser.

Fifty is the magic number for several New Hampshire towns that are taking part in an abandoned car pickup program arranged by the North Country Resource Conservation and Development Project. A salvage operator stops at several collection points after he is told that the total number of old cars exceeds 50. RC&D Project officials initiated the project and made the

original contract agreement. Town officials are responsible for maintaining publicity and pickup service and determining the place to pile the hulks until the collector makes his rounds again.

Looking ahead . . .

Nature itself, without man's stewardship, has rarely been productive enough to meet man's needs—certainly not in the numbers in which we exist today and will exist in the future. Yet our resources must serve every economic and social need of mankind. The challenge is to maximize the productivity of the environment for both necessities and amenities and assure continued use into the very long future.

This requires an integrated approach to assure:

- (1) The necessities of life: Adequate food, fiber, shelter, and raw materials for industry.
- (2) The safety of man: Safe and adequate water, clean air, productive and safe soil held in place, sanitation, disease and pest control, the perpetuation of basic life processes.
- (3) Quality of life: Space to live, attractive surroundings, suitable habitat for plants and animals, outdoor recreation, and esthetic satisfaction.—SECRETARY OF AGRICULTURE CLIFFORD M. HARDIN, at the National Farm Institute, Des Moines, Iowa, Feb. 12, 1970.

Soil micro-organisms are under cover agents for an irrigation-drainage treatment experiment in California's San Joaquin Valley. Researchers are using microbe power to clean nitrate-laden waste water from irrigated fields. By placing tiledrain lines at varying levels below the water table, they create conditions that enhance denitrification processes. Scientists hope to learn the best pipeline depth for adequate denitrification of drainage water before discharge. Favorable results of laboratory work done by Agricultural Research Service scientists at Brawley, Calif., preceded current. full-scale field studies near Firebaugh, Calif. SCS and the Bureau of Reclamation are cooperating in the project described in the May 1970 issue of Agricultural Research.

From the Administrator:



They'd rather learn by doing it

Here's a question for the "over 30" professionals in resource conservation: Are we hampered by a generation gap in our effort to get on the right wave length with the young people of America?

We have built the resource-conservation movement on a deeply rooted faith in the future of America. We firmly believe that the principles of resource conservation can produce a satisfactory environment for the generations following us.

We have been aware, however, of a degree of "static" in our efforts to tell the conservation story. This part of our program is by no means limited to the "under 30" audience.

An abiding belief in the future undoubtedly accounts in large measure for the dedicated efforts by the Nation's corps of professional conservationists and resource managers to acquaint young America with basic conservation practices and understanding and to involve the youth of this country in purposeful conservation projects in their own communities.

Many organized groups, such as Boy Scouts, Girl Scouts, Campfire Girls, and 4-H Clubs, carry out conservation programs in structured fashion, offering tangible rewards for work accomplished.

Other young people receive their initial introduction to natural resource relationships through camping experiences with youth organizations or church groups or by means of school-sponsored field trips.

Adults sometimes have a tendency to equate teaching with talking. Youngsters prefer to learn by doing. For most young people today, such programs must have a sense of purpose, not only for the moment of doing, but for the larger intention and the long-range objectives as well.

To offer young people a "conservation project" for which all decisions have been made and all details worked out in advance by adults is a way of saying, "Here's a new toy. It will keep you in the fresh air

and exercise your muscles, but you can stash your brains."

Conservationists of the Soil Conservation
Service often are called upon to help with
youth programs in resource use and management based on conservation principles.
Many of these projects offer opportunities
for involving young people in the planning
stages of the activity. In helping to develop
a conservation plan for a camp, for example,
youngsters gain an extra dimension of environmental understanding. They can relate
the many rows of trees to be planted, the
many miles of streambank stabilization
needed, to the long-range plan for the camp
and to their own stake in the camp.

District leaders also have a responsibility toward the individual involvement of youth. Invitations to youth groups to attend conservation-planning meetings, or to serve as adjunct committees on projects within the community, can bring about a deeper perception of personal responsibility toward the use and management of natural resources.

A conservation project for any youth group should never be considered to be simply a high-class outdoor baby-sitting service designed for adolescents. In reality it is a significant opportunity to weave into the fabric of resource relationships still another natural resources strand—this one resilient with youthful enthusiasm and imagination—to add strength and excitement to the web of life upon which the future environmental quality for all mankind depends.

Kenneth E. Stant

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Outdoor fun instead of floods

Twin Valley Lake in Wisconsin's Governor Dodge State Park was designed primarily as a flood-prevention development.

However, if residents of the area mention it, they are apt to speak of it first as a fine place for boating, fishing, swimming, and camping.

The park, now with two lakes instead of one, is regarded as one of the state's outstanding areas for recreation. Before Twin Valley Lake was built, water-related recreation for the area was provided by Cox Hollow Lake with its swimming beach and bathhouse.

The new lake, with 150 acres of surface water, is a joint effort of the Soil Conservation Service and the Wisconsin Department of Natural Resources. Costs of the dam were shared, with design and supervision of construction by SCS.

The Twin Valley Dam improved the stream for trout fishing. This was made possible by the release of water from the lake's cool bottom into the stream. The stream suitable for trout extends about 3 miles from the dam.



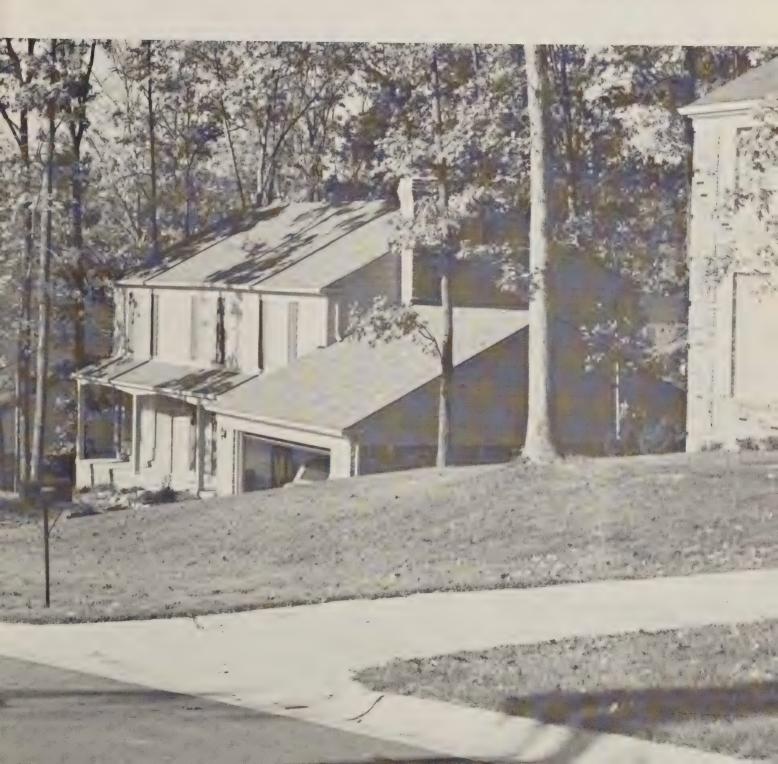
Wisconsin's Department of Natural Resources shared in the development of Twin Valley Lake, now a popular recreation spot.

Birch Lake near Barneveld, with a growing reputation for good trout fishing, also was developed as a flood-prevention structure with the cost of recreation features shared by project sponsors. It is a small lake with facilities for picnicking and swimming.

The new Twin Valley Lake area

has been developed for swimming, picnicking, and boating, although boats with motors are not permitted. Trails called "White Oak" and "White Pine" provide an opportunity for contact with Wisconsin's fascinating natural environment.— Charles V. Bohart, recreation specialist, SCS, Lincoln, Nebr.

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Let's put it here . . .

Stay alert if you want to keep up with land use changes—there's a new America every morning. Some "building booms" and other shifts are made on the basis of community aims and natural resource information supplied by SCS, conservation districts, and others. But many more need to be.

This month's offering is a sampling of USDA helpfulness in planning on both rural and urban property to avoid environmental damage and meet more positive aims of the owner and the community.

In the lead article (p. 99), USDA Director of Agricultural Economics Don Paarlberg discusses ways to bring rural America out of stagnation.

Gordon Zimmerman (p.100) carves out a role for conservation districts in community planning.

Other articles reinforce these messages with specific examples of factors and sources of help that any developer or planner ought to consider.

COVER: These new homes in the Montgomery Soil Conservation District in Maryland were "planted" to fit the existing topography and forest vegetation. By Don Paarlberg

Let's redress the imbalance

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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Let's redress the

"Ill fares the land, to hastening ills a prey . . ." was written of the English countryside nearly 200 years ago. It might be written of rural America today.

Our rural areas are being depleted of people. From 1950 to 1960 the rural population—farm plus nonfarm—declined by 400,000; the urban population increased by 28 million. These trends have continued.

About one-fifth of the rural population consists of farm people. The others live in the countryside or in small villages. Since 1960 the farm population has been declining at an annual average rate of about 5 percent, an accelerated pace.

Most of those who migrate from the rural areas leave in their teens and twenties, when on the verge of their productive years. They carry with them the investment in their upbringing and education. Conservatively estimated at \$15,000 per person, this human investment is a contribution from the rural areas that runs about \$12 billion a year, several times the total of all subsidies provided by agriculture.

What becomes of these people? They move into our great cities. Without necessarily desiring it and almost by default, we are becoming an urban society. Seventy percent of our people now cluster in cities that cover 1 percent of our land area. If present trends continue unchecked, 80 percent of our people will be living in metropolitan areas by the year 2000, and most of them will be crammed into five super stripcities.

And will these be alabaster cities,

gleaming "undimmed by human tears"? Not likely. The migrants concentrate, unassimilated, in Detroit, in Cleveland, in the South Side of Chicago, in Watts, in Harlem, in Indianapolis, and in a hundred other cities. Smog, congestion, water pollution, law enforcement, and other problems of the megalopolis beset them and their uneasy neighbors. By generating the kind of "urban crush," they create a problem in the cities to which they go. By depopulating the countryside, they create a problem in the rural areas from which they come.

But move they must, if there are no nearby jobs.

And why are there so few jobs in the rural areas?

For several important reasons.

First, because of the agricultural revolution. The mechanization of agriculture has so multiplied the productivity of human beings that the production of our food and fiber is now accomplished by 5 percent of our population, as compared with about 18 percent only two decades ago. There simply are not as many farm jobs as there were. These revolutionary changes have by no means run their course. The Department of Agriculture says that from 1965 to 1980 farm employment will experience an additional decline of more than one-third.

Second, because imagination has been lacking. Little has been done to create job opportunities, in the rural areas, for the people forced out of agriculture. Rural people do very well at off-farm jobs if the jobs are there and if they have the necessary education. They have

imbalance

By Don Paarlberg
USDA Director of Agricultural Economics

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What the American people really want and will work for, they can have.

manual dexterity and they know how to work. They do not want to live on a dole. If off-farm jobs are available within driving distance, they continue to live in their accustomed surroundings, among their friends and families, benefiting from increased incomes, providing improved education for their children, and utilizing the services of the local community. But without such jobs they must go on relief or move to the city.

Seemingly, almost everything has conspired to prevent the creation of jobs in rural areas:

- —Federal farm programs have cut our cotton crop to 12 million acres compared with 43 million acres before the programs began.
- —Tobacco acreage is now only half as great as 35 years ago.
- —Local communities have not provided the services and utilities needed to attract industry.
- —Wage policies have discouraged industry from expanding into areas of abundant labor.
- —Industry, which has been urbanminded, has not sufficiently sought to decentralize.
- —The rural labor force lacks the Federal employment services available to urban workers.
- Education policies have discriminated against the poorer areas. For example, a survey showed that allocations from the Elementary and Secondary Education Act of 1965 provide more than twice as much help per pupil to the counties ranking highest in the index of rural well-being as they do to those ranking lowest (\$350 against \$157).
- —Farm programs have continually sought parity of prices as an ob-

jective, when they should have sought parity of opportunity. For more than 30 years these programs have been commodityoriented, when they should have been people-oriented.

It has been fashionable to point critically at the hardships that resulted from the Industrial Revolution of the 19th century and to find fault with those who could have alleviated these difficulties.

Now, in the 20th century, we confront an Agricultural Revolution that creates problems and opportunities in some ways similar to those of the Industrial Revolution. There is no reason to accept, unquestioned, the social and economic consequences of this Revolution. Efforts should be made to determine and assert the public interest.

The American people want some balance between the rural and the urban sectors. There should be some opportunity for those who wish to live in the country to find decent work there, to have access to reasonably good education and health services, and to pursue a way of living that gives diversity and balance to our economy.

These things can and should be done:

(1) Locate more of our new factories in rural areas. This can be done by local, state, and national tax policies to provide realistic economic incentives. Guaranteed loans can be used, with favorable interest rates. Better roads, better schools, and better public utilities will help. Factories may now be operated successfully in areas where this was formerly not possible. At an earlier time, when transportation was poor and the emphasis was on heavy industry, a factory had to be close to its raw materials or to its markets. This is far less true today. The Federal-Interstate Highway Program has greatly facilitated transportation. For some industries a plant can now be established almost wherever a trained labor supply and the necessary supporting services are available.

(2) Provide better education for rural people. This means better education of all kinds, at all levels: elementary, secondary, and advanced; vocational, technical and academic; continuing education for adults, apprenticeship, retraining, and all the rest. It means equal education opportunities for all races including minority groups which comprise about one-fourth of the rural poor. Education is a great adjuster; people who are making great changes are in greater-than-ever need for it. Rural young people move freely across state and county lines. Sharing the cost of education on a national basis is appropriate in view of the fact that we are concerned

Tomorrow on

By Gordon K. Zimmerman

Executive secretary National Association of Conservation Districts, Washington, D.C. here with a national problem. The need is greater where the taxable wealth is most scarce.

(3) Provide improved facilities in rural areas. This includes public services as well as improved private housing. Public needs include water, sewer, electric power, communication, and recreational facilities. Rural housing in many areas is substandard and needs improvement. Rural areas must be made more pleasant places to live in if people are to be held or attracted. Government should help in all these areas with loans and grants.

What is here proposed is not a blueprint for the economy, with a certain calculated number of people on farms or a carefully computed balance between rural and urban areas. Rather, we should redress the imbalance in education and opportunity which has worked to the disadvantage of the rural areas and threatens to make us almost totally urban.

To undertake the actions here offered does not introduce a rural bias; rather, it would remove an urban bias, largely unintended, that has been allowed to develop. We should provide the equality of opportunity which will give our people a chance to develop the kind of society they want. If this is done, we can safely leave to the people themselves the decision as to the balance

between rural and urban living.

There is no one-shot, sure-fire, cure-all solution to rural unemployment, underemployment, and general rural underdevelopment. There are a variety of programs, policies, and procedures that singly and in combination can help to mitigate the consequences of this rural stagnation. What is required is a multipronged attack on the numerous ills that beset our rural areas.

What the American people really want and will work for, they can have. We are not the helpless objects of blind economic forces; we are capable of helping to shape the institutions which in turn help to shape us.

our own terms: A role for conservation districts

High on the list of assets treasured by a free citizen in a democracy is the power of choice. Individually and collectively we exercise it day in and day out in what we buy, how we vote, what we read, and in dozens of other ways. It is the power which distinguishes the free man.

Choice is the fruit of judgment and nowhere is it more important than in shaping the kind of community we would like to live in. The community may be small, involving no more than the immediate neighborhood. It can be larger: A township, conservation district, county, watershed, or even the great political and geographic entities a state, region, or the whole Nation. To the extent that natural resources affect or determine the nature of any of these communities, there is a clear opportunity for district leaders to exercise a constructive influence and make valuable contributions to agreeable living.

Under the pressures of population change—growth or shrinkage — progressive communities all across the country are re-assessing their future. They are taking stock of their human assets, their institutions, and their physical resources, which together must provide the foundation for new directions and beneficial change. Communities are weighing the possibilities and probabilities of developing a more satisfying life of dignity, happiness, and service for their families. That's what it's all about—or should be.

Wherever and whenever communities undertake to improve their lot, districts can and should help. Whether the goal is economic development, environmental improvement, flood prevention, water supply, better farm and ranch management, resource protection, or orderly suburban growth, districts can contribute to the attainment,

When district leaders are functioning effectively, they bring experience and practical resource knowledge to the community planning table. They understand the local resource capabilities and are able to identify the development opportunities as well as the resource-management options.

District leaders also are in a

position to buttress community planning with specialized and expert assistance from a range of public and private sources. Whether the community is a whole district, part of a district, or several adjoining districts, responsible district officials have access to scientific, financial, educational, and other kinds of professional help. They can bring to bear on the planning process the contributions of soil scientists, economists, forecasters, biologists, planners, engineers, and other specialists engaged in state and federal programs directly or indirectly involved with natural resources.

Planning is an exercise in charting orderly routes to desired goals. It is an expression of preference and a choice from the available alternatives. The resources at hand constitute the rational starting place for any well-designed community planning effort. District leaders not only can stress this approach and press for full consideration of resource values, they also can give muscle to the power of choice at the grass roots, which is to say the community. •

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Team helps Connecticut grow in the right places

Development can be a different ballgame when a team bent on maintaining environmental quality is allowed to do some coaching. The Eastern Connecticut Resource Conservation and Development Project has a Development Practices Team. It advises developers and local planning commissions of construction-site possibilities as well as limitations. The project serves to some extent as a development-staging mechanism for an 890,000-acre swath of greenspace on the urbanizing eastern seaboard.

In keeping with sponsors' hopes of forestalling second-rate development in the project area, the team works with 40 towns and three regional planning agencies.

According to the size, location, complexity of the site in question, the team may include a regional planner, soil scientist, soil conservationist, sanitarian, and an engineer from various agencies.

Any and all of these specialists may be called on by the team leader if early studies show that a site might be developed in a better or more creative way than its owner first envisioned.

The team's aim is to help make the best use of soil, slope, aspect, scenic features, and existing character of surrounding neighborhoods.

Town or regional officials who hear of plans to develop a tract contact the owner and suggest evaluation by the team. If he agrees, the owner requests assistance from the RC&D Project committee through the soil and water conservation district. The team leader then

studies the site and soil survey information to determine which team member should make a thorough study.

"This initial screening on the basis of soil limitations is an all-important part of the process," RC&D Project Coordinator William Lucas said. "An onsite review and report is developed by the entire team."

In a typical report, the team indicates the need for and advantages of applying sound land use and conservation-treatment principles and points out or helps identify:

—where site problems may arise because of terrain and kind of soil;

—suggests ways to deal with wetlands preservation, unique or beneficial natural vegetation, streambank treatment, and sewage disposal;

—indicates local housing and recreation needs; and

—advises the developer of sources of professional help.

The team cooperates with private consultants in land use planning and development work. The facts prepared and presented by the Development Practices Team to the local decision-makers enable them to make more than a cursory review of the development plans.

Neither the town nor the developer is required to participate in the program, but both stand to gain.

"While the results may not be as dramatic as those brought about by huge developments in more rapidly growing areas of the state, small developments nevertheless have a profound cumulative effect on the existing community and its resources," Lucas said.



"The availability of the team's services gives added help to towns that already have planning and zoning. It helps those that have no provisions for subdivision regulations."

During the first year of cooperation, the entire team helped with four reviews. Three more sites with inherent soil and water conservation problems were handled by SCS conservationists, in consultation with the developer and town officials after a soil survey was completed.

In one case, soil information about severe septic-tank limitations caused an owner to change his tract from residential development to a low-density recreation area. At another site, owners in the planned 100-home development would likely have had septic-tank failures because of land and water features;

the team's review brought a decision to put homes on larger lots, and use part of the site to expand an adjoining park.

The team also has worked out a plan for wildlife plantings and other conservation methods of enhancing a particularly good building site.

The 40 towns in eastern Connecticut will grow to accommodate an estimated threefold increase in population by the end of the century. The Development Practices Team, by working with local units of government, builders, and private consultants before final plans are made, can help guide that growth to enhance the quality of life for Connecticut Yankees, old and new.—Charlotte Conrad, information division, SCS, Washington, D.C. •

SCS members of resource teams aid in planning a wildlife marsh (left) and discussing land use concerns in a watershed project.



Township of tomorrow

A community of tree-lined streets, wide and spacious green belts, houses blending into the topography, and silt-free lakes and streams.

A fantasy? Not in the minds of the residents of Oakland Township, Mich. This community is planning its township of tomorrow today.

Oakland Township, 25 miles north of Detroit, is directly in the path of that city's outstretching suburbia. Realizing that its projected population of 50,000 by the year 1990 could cause many land use problems, this township is working with a variety of individuals and groups to insure orderly development.

It was the first municipality in Michigan to pass an erosion control ordinance for developing areas. Builders now are required to include necessary conservation measures on all construction projects.

It is one of the progressive communities in the Nation to develop and pass a conservation ordinance—covering flood-plain zoning, preservation of natural resources, tree planting, beautification, and other measures geared to an orderly growth and development pattern.

The Oakland County Soil Conservation District has worked closely with the Oakland Township Planning Commission during development of conservation ordinances and sediment-control standards. As a result, the district will review all future building projects in the township and check for the inclusion of erosion and sedimentcontrol measures and for their conformity with design principles set forth in the ordinance.—ROBERT G. HALSTEAD AND ELLIS G. HUM-PHREY, area conservationist, SCS, Ann Arbor, and district conservationist, SCS, Pontiac, Mich.



Cattle in Appalachia

Beef cattle farming in southeastern Ohio's Appalachian country can be as profitable as anywhere in the United States, Bob Evans insists. "Water distribution, high-quality forage, and quality livestock are what it takes to make an operation work."

Evans—known to midwesterners for his sausage products, restaurants, and pure-bred Charolais cattle—proves his statement almost daily to visitors at his 2,000-acre Hidden Valley Ranch near Gallipolis in Gallia County, Ohio. Cattle grazing lush grassland offer support for his argument.

Evans started ranching after he came home from World War II and soon became a cooperator with the Gallia Soil and Water Conservation District. Working with Soil Conservation Service specialists, he has continued to adopt new and

sometimes untried grassland-farming techniques. All of his grassland seedings are Kentucky 31 tall fescue, orchardgrass, or bluegrass. Separating them by pastures, Evans is able to manage each grass for its favorable most characteristics. Liquid nitrogen and rotational grazing also help assure long-term, healthy stands. Sericea lespedeza is seeded on new areas until grass seeding can be made. This protects the soil, helps heal erosion, and improves the land for use as grassland. It also provides food and cover for wildlife and good hunting.

Year-round grazing is a recent practice. Wooded areas furnish needed shelter against winter wind and snow. Round bales of fescue hay left in the field are a winter food supply.

"Our herd seems to prefer the open country to wintering in a barn," Evans said. "They are healthier than most sheltered cattle. We also cut down on labor and high building costs."

Evans has built a new pond every year. SCS specialists checked out the new pond sites and designed the impoundments. In addition to 20 ponds, Evans has five spring de-

velopments supplying water. He thinks the cost of these water-resource developments has been defrayed by increased efficiency.

The third requirement, along with quality forage and water, is the fast-gaining quality of livestock. The breed is not important if the animals are capable of producing 600-pound-plus calves for fall sales, Evans said.

Land-improvement and cost-saving procedures account for much of the successful ranch operation that has turned Hidden Valley Ranch into a "conservation showcase" with tangible economic benefits for the community. Scores of people are employed either on the ranch, in the sausage plant, or in the local restaurants. Farm equipment, fertilizer, and related agricultural businesses enjoy the side effect of this added prosperity.

"This Appalachian area has a good future," Evans predicts. "We have the land, climate, and ample water for cattle farming. All we need are more people willing to work at building a profitable cattle ranch."—GORDON S. SMITH, information specialist, SCS, Upper Darby, Pa.

Two centuries ago, Washington, D.C., and Savannah, Ga., were new towns built according to advanced plans. But a new town of today, Jonathan, Minn., has an advantage in the involvement of a conservation district.

Soil survey data and conservation practices designed to enhance the natural resources of the 2,200acre development have been worked into plans with the help of the Soil Conservation Service and the Carver County Soil and Water Conservation District.

The new town in southeastern Minnesota is (like the county) named for Jonathan Carver, an 18th century explorer. Jonathan is within the boundaries of the city of Chaska, to the west of the Minneapolis-St. Paul metropolitan area. Both lie in a major growth corridor between Lake Minnetonka and the Minnesota River.

Jonathan was among the first to receive financial assistance through the Department of Housing and Urban Development under a program for new communities. A commitment for potential guarantee of \$21 million in debt obligations was signed by HUD Secretary George Romney in February 1970. The initial development is to be doubled in size to accommodate a future population of 50,000.

When plans were announced in the summer of 1967, Carver County's soil survey was completed but not published. SCS District Conservationist Don Berg and SCS soil scientists developed a soil capability map of the area using field mapping sheets. They made urban interpretations showing major building site limitations for Ben Cunningham, Jonathan's chief planner.

This approach to community planning was instigated by State Senator Henry McKnight. Having cooperated with the Carver District since 1959, McKnight knew the source of soil and water conservation assistance. Plans for his beef cattle farm adjoining the new town reflect the benefits of a good work-

A new town fits the land

ing relationship with SCS and the conservation district. "We have to redo our thinking to save the land rather than redo the land to serve us," Senator McKnight said.

Overall planning for land use designated 27 percent of the land for residential areas; 25 percent for recreation and open space; 17 percent for industry; and the balance for roads, lakes, and commercial and religious use. Six new industries already have located in Jonathan.

Among the first targets of conservation activity were critical slopes that needed to be clothed in grass and trees to control erosion and sedimentation. All former cropland is being converted to grass to keep soil in place. Berg recommended a selection of grasses and fertilizers to do the job.

Marsh areas that have long been neither wet nor dry enough to use are to be reflooded to make homes for wildlife and add esthetic value. State forestry and wildlife people are helping plan for full use of wooded areas and nature trails.

Although Jonathan is surrounded by some of Minnesota's "10,000 lakes," it has one of its own, too. Lake Grace, named for Mrs. Mc-Knight, was finished in the spring of 1968 by a private engineering firm that used SCS soils and hydrology data. An apartment complex, a shopping center, and an area designated for cluster development overlook this focal point.

Parks surround the town center by the lake with space for golf, playgrounds, picnic areas, and woods. The entire town is laced with treelined greenways for walking or bicycling.

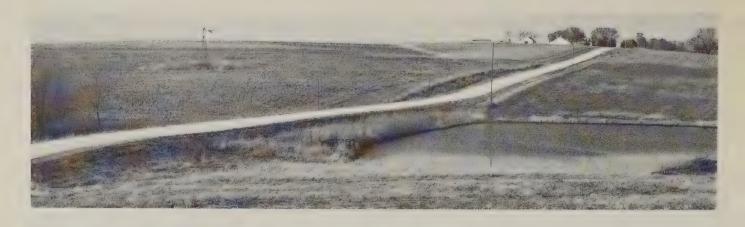
A 300-acre tract adjoining Minnesota University's aboretum and

fruit research farm has been set aside as an educational center.

Each village in Jonathan will have its own shopping center, schools, and playgrounds, all linked with the town center by a parkway system. Site selection for village centers was based primarily on terrain analysis. They are large areas of flatland with exceptionally pleasant natural features, centrally located within a logical land area.

A four-building complex of 24 units each is being completed. Village One includes demonstration areas for new-housing concepts such as flexible modular houses and industrially produced "stack" units available in single or multifamily combinations.

Now that the building of Jonathan is underway in earnest, the creative conservation plan of Henry McKnight and his staff is being put to the test. From all indications, Jonathan will continue to be a good example of development based on today's technology that meets the needs of people in a city of the future.—John M. Cross, information specialist, SCS, Lincoln, Nebr. •



Build a better crossing and save money

Assistant area conservationist, SCS, Lincoln, Nebr.

By Ray Kubie

In southeastern Nebraska, an area sometimes plagued by intense, soil-eroding and flood-producing rainstorms, road improvement has become a practical result of conservation planning.

The replacement of rickety or otherwise unsuitable bridges may be undertaken with the building of a dam, which would perform double duty as a container of sediment and a better stream crossing.

Since the late 1940's, when soil and water conservation district supervisors first conceived the idea, the use of drop-inlet structures for road improvement has been readily accepted by boards of county commissioners, watershed conservancy district directors, and Agricultural Stabilization and Conservation Committeemen, as well as the conservation districts.

The pilot and Public Law 566 watershed programs of the Soil Conservation Service gave further opportunity for improvement of roads, both with erosion-control dams and those installed for flood prevention.

Roads match up with watershed dams (left and below) and a grade-stabilization structure (above) for better travel and water control.



Where topography and other considerations permit, either type may be located on the road right-of-way where the structures take the place of bridges or culverts. Where the dams are in drainage courses above county roads, the counties may replace existing bridges, as a part of their regular replacement program, with corrugated metal culverts at a considerable saving to the local taxpayers. Seven such installations were made in Otoe County in 1969. The total to date in that county is 60.

Nemaha County has installed 30 road structures, Butler County 15, Saunders 18, Seward 17 with seven more on the waiting list, Richardson County 12 in recent years (with about 400 in years past), Lancaster County seven, Pawnee County 15, Cass County five, and Johnson County 17. There have been fine examples of cooperation from the Nebraska State Highway Department where problems existed and conditions were feasible for installation. This has been particularly true in the structural phase of the watershed program.

Costs for installation may be borne by an individual farmer or a group of farmers, often in cooperation with ASCS, the county, or local sponsors of watershed projects. The federal government shares the cost of dams in watershed projects. In each case technical assistance is available from SCS.

Combining conservation land treatment with properly located structures produces benefits to individuals and the community in ways—supplemental stock water, erosion control, flood prevention, savings in road and bridge installation and maintenance, improved roadways for moving large equipment and reduction of normal traffic hazards, reducing stream pollution from sedimentation, improvement of wildlife habitat and recreation potential, and beautifying the countryside. •

Conservation plan aids special school

By Paul Miletello
District conservationist, SCS, Minden, La.

E vergreen Presbyterian Vocational School near Minden, La., occupies 500 acres of campus and farm and pasture land.

It is a training ground where boys and girls who learn more slowly than the majority acquire skills to help them find a place in society.

The school is operated by the Presbyterian Synod of Louisiana, but support comes also from the state and from private sources.

"We help each student recognize those things that he can do to be acceptable in our society," Ralyn Parkhill, director of the school, explained.

The Soil Conservation Service, working through the Dorcheat Soil and Water Conservation District, helps the school with conservation and related jobs as do other federal and state agencies.

"We have developed a conservation plan for our land with SCS technical help," the director said. "The soil survey helped us to decide which areas to use for cropland, pasture, and recreation. With efficient farming, we can produce most of the meat and milk we need here."

Agricultural training at the school consists of dairy, beef cattle, and swine management; use of milking machines and the pasteurization process; planting, cultivating, and harvesting of row crops; fencing; and constructing farm buildings.

Forestry training includes the harvesting of poles, sawlogs, and plupwood; timber-stand improve-

ment; planting and interplanting; maintaining fire lanes; and loading and hauling of forest crops.

Fishing and boating are among recreational activities. Three large ponds, built with SCS engineering help, are stocked with bream, bass, and catfish furnished by the Dorcheat District.

A large part of the farmwork is done by the boys.

"They are learning from experience," Joe Pierson, farm manager, said. "We have boys who are actually running the hog and dairying part of the operation."

At times, groups of students live and work off the campus. The most recent off-campus work was for the city of Minden, La., and the Trail-blazer-4 Resource Conservation and Development Project. Crews helped install two water-control structures and planted grass on eroded cutbanks of the city airport.

Farm management and conservation at Evergreen School are helping give mentally handicapped boys and girls a chance in life. •

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Everything but the kitchen sinks . . .

Watch what you do with Alaskan soils

Different! That's what many visitors say about Alaska. The term fits some of the soils of the vast northland state, particularly those with permafrost.

Permafrost is a condition brought about by extremely low average temperatures. Around Fairbanks where temperatures may range from -65 degrees to more than 90 degrees Fahrenheit—you will find plenty of permafrost. The term means permanently frozen soil material. The uppermost layer in most soils with permafrost thaws and remains saturated during the summer but freezes in winter. Vegetation provides natural insulation, and water below this "active layer" stays frozen in the soil even when air temperature is above freezing. Permafrost has been found to depths of more than 150 feet around Fairbanks. Normal temperature in the permafrost is 30 to 31 degrees. It takes little additional heat to thaw the soil.

Successful use of soils underlain by permafrost calls for understanding them, a goal undertaken by the Fairbanks Soil Conservation Subdistrict in recent years.

What's the concern? A soil with permafrost "acts up" when the natural cover is removed by people intent on some use other than nature designed for it—such as cultivating it for crops or building houses on it. The permafrost melts, causing the soil to settle.

Most soils with permafrost should not be farmed, but some soils with permafrost are excellent for farming after clearing—except for unstable conditions that come with thawing. Silt loam Minto soils with slopes ranging up to 12 percent, for example, respond well to development for farming and will produce any locally adapted crop.

Minto soils are difficult to use, though, because they contain clear or nearly clear deeply buried ice masses ranging from the size of a football to that of a small house.

After the land is cleared, Minto soils will seem normal but removal of the surface vegetation, which provides natural insulation, allows the summer sun to warm the soil. Three to 5 years after clearing, the surface may begin to settle—slowly, but creating a hummocky surface. A deep ice mass may leave a cavern after

thawing. During the spring breakup when soil is saturated the soil over the cavern may suddenly fall—resulting in a topographic condition called "thermokarst" pitting.

In some cases, caverns formed underground have caused farming hazards. One farm operator had the front end of a fully loaded truck fall into a hole. Another had a cow missing 3 days before he thought to check a field with a number of large open pits. Luckily, with a little water and feed, the cow was none the worse for her "pit stop."

On another farm with an unusually large pit, a large tractor was used to fill in the hole. The farmer said only the top of the exhaust stack was visible as the machine worked at smoothing the bottom of the pit.

Common visual evidence of thermokarst pitting is a honeycomb pattern over a field, caused by general settling. Troughs or low areas may be 3 to 5 feet lower than mounds around which they form. This shows





Soil with permafrost can make a fence a roller coaster, a house a story-and-a-half, a field a crater. A Fairbanks couple (above right) checks with the author to avoid homesite problems.

up especially in potato fields seeded to grass. Annual tillage helps fill low areas. When an annually cropped field is seeded to grass, the pitting develops rapidly—in some cases, fields have become too rough to harvest hay in just 5 years. A pitted field can be smoothed, however, so farming operations can be resumed.

One of the better cropland soils in Tanana Valley, Minto can be cropped annually in periodic rotations with green-manure crops.





Areas with Minto soil also appear —to the uninformed—to be excellent building sites: Gentle slopes, silt-loam soil, and an excellent view of the Tanana Valley. With the growth of Fairbanks, especially under the influence of the North Slope oil boom, need for good building sites is great, and people are looking for places outside the city for building. A homesite 100 to 200 feet above the valley floor means temperatures 10 to 20 degrees F. higher in winter. That's important when temperatures stay at 50 to 60 degrees below zero for weeks at a time. The higher elevations also are more nearly free of ice fog-a form of air "pollution" common in the Fairbanks area when the mercury goes below minus 30 degrees.

But having a nice clear view isn't much help when your house settles into the ground! Many structures have been damaged by soil subsiding under all or part of the building.

How can people discover where soils are affected by permafrost? The Fairbanks Area soil survey made by the Soil Conservation Service has been a big help. Completed about 8 years ago, it shows locations of each soil with good accuracy and gives hints on proper use or limitations.

There are many soils around Fairbanks that do not include the ice masses—for example, the Chena, Fairbanks, Gilmore, and Salchaket series.

Because of the trend toward building on Minto or other soils with permafrost, the Fairbanks Subdistrict launched a program to inform people about the hazards they might encounter and help them find more suitable sites.

SCS representatives met with bankers and real-estate people. They distributed copies of the Fairbanks soil survey. They explained problems of thermokarst pitting and how to identify soils of the area.

The Borough Planning Commission (the Borough is the equivalent of a county in the lower states) reviewed problems with SCS. A new

zoning ordinance requires all subdivision maps to show soil properties or hazards in the soil survey.

Television and radio programs and newspaper articles discussed the issue. Residents eagerly sought information as an aid to buying land, building, and locating potential drainage fields. The supply of the soil survey was quickly exhausted and a reprint had to be ordered.

Because of his efforts in getting information to the public on permafrost and thermokarst pitting, Henry Gettinger, chairman of the Fairbanks Subdistrict, received the Governor's "Soil Conservation Man of the Year" award in 1969.

The job of getting people to know permafrost and its limitations is not finished. Thousands of newcomers will need the information in the next few years. The story of permafrost is one that will be told and retold thousands of times.—Burton L. Clifford, district conservationist, SCS, Fairbanks, Alaska.

Conservation farming serves a larger purpose



A resident work crew mans a field chopper to prepare mulching material for protecting seeded areas on the Vienna farm.

A 3,500-acre farm near Vienna, Ill., is becoming a conservation showplace. A conservation plan is in effect, worked out by the owner with the help of the Soil Conservation Service and the state's district forester. An agreement is in cooperation with the Johnson County Soil and Water Conservation District

Owner of the big farm?—the State of Illinois.

The farm is a prison without walls. The 800 or more men who live there—undergoing rehabilitation before returning to their communities—are supervised by officers and teachers carrying no weapons.

When Vernon Housewright became the warden of the institution, he already had helped develop a vocational training program for prisoner rehabilitation. He immediately asked the SCS staff assigned to the district for help to develop a conservation plan.

The 5-mile-long tract of crop, pasture, and timber land is made up of small farms bought 10 years ago. Uplands were eroded and many

fields had been abandoned. Woodlands were neglected and fire damaged. Bottom lands at the confluence of three creeks were undergoing periodic flooding. Two areas were in swamp and supported remnants of disappearing species of plant and animal life.

The long-range conservation plan was almost a year in the making. A soils map was the basis for decisions on land use. Then detailed plans included field arrangements, development of water supplies, and specific management practices.

Installing measures called for in the plan and operating the farm are helping the men learn useful skills for their return to the world beyond the farm's boundary.

Of major importance has been planning for erosion control above the 75-acre lake that supplies the farm's water needs. New roads with unprotected banks were a source of silt buildup in the lake.

Major watercourses and acres of borrow area (where topsoil had been removed for construction) needed shaping, mulching, and seeding. Watershed work to relieve the flood hazard also went into the plan.

A site was chosen and design made for a sanitary landfill. Tree planting in odd areas, establishment or improvement of 400 acres of grassland, and development of two recreation areas near the lake were added.

The Nature Preserves Commission recommended preservation of one of the swamps as a zoological study area. This, too, went into the plan.

"We are in the business of conservation here," Warden Housewright said. "Through conservation of our land we are helping with the conservation of people."—EDWARD B. TROVILLION, district conservationist, SCS, Vienna, Ill.

Plan for a better future in the heart of Utah

By Carl W. Wilker

Resource conservationist, SCS, Richfield, Utah

The six counties of the Central Utah Multi-County Planning District lie in an area of coveted treasure: Clean mountain air, sparkling streams, and breath-taking scenery.

There are other valued resources, too; and the people are getting ready to do something about all of them.

The old State Capitol at Fillmore and the Temple at Manti, both monuments to Mormon pioneers, are among the area's history-related riches. And if you thrill to stories of the early West, there is the hideout of Butch Cassidy and the Wild Bunch in the Robbers Roost country of Wayne County. The Cassidy family cabin is near Circleville in Piute County.

Other counties in the planning district are Juab, Millard, Sanpete, and Sevier. The 54 communities in the area are home to 35,500 people. Richfield is the largest with a population of 4,410.

County governments and the soil conservation districts serving the area are providing the needed planning leadership. Commissioners of the six counties have a three-man Agricultural and Natural Resource Committee directing natural resource development. This committee is assisted by a three-man Soil Conservation District Steering Committee representing two districts in Millard County and one in each of the other counties. Federal, state, and local agencies assist the two committees.

More than 120 proposals for conservation and development of natural resources have been brought forth by local groups. The leaders estimate that the actions when completed will boost income in the six counties by as much as \$2 million. Four-fifths of the income would go directly to the people in the counties.

Conservation use of the rich water resource ranks uppermost in the planning effort. More than 50 of the proposed activities hinge on the use of water, mainly through irrigation. Nearly as many have to do with conservation development of range. Other proposed action includes flood prevention, community improvement, beautification, and public recreation facilities.

Perhaps the most ambitious proj-

ect is planned for the Sevier Basin, the lower three-fourths of which is located in the planning district. From the Upper Colorado River, 30,000 acre-feet of water will be diverted to Utah's Wasatch Front and then into lower Sevier River Basin via the central Utah project.

Virge Brown, Sevier County commissioner and chairman of the six-county Agricultural and Natural Resource Committee, said that diversion of the 30,000 acre-feet of water is the key to water-resource development in the Basin.

And Jack Monroe, chairman of the SCD Steering Committee, explained: "A basinwide program is needed if we are to develop the water resources of the Sevier. Present water rights must be protected. All the people should share in the improvements and benefits."

Another source of water can be found in 12 known underground reservoirs with estimated storage of 424 million acre-feet — 550,000 acre-feet of which is in the upper 200 feet of the reservoirs. Conservation of present supplies and development of these underground reservoirs could provide dependable water for the 333,000 acres of presently irrigated cropland.

Increased tourism is expected to bring added revenue. Three hard-surfaced highways crossing from north to south are routes to popular recreation spots: Bryce, Zion, and Cedar Breaks National Parks, Glen Canyon National Recreation Area, and the Grand Canyon National Park.

The investment needed to improve the economy and quality of life in the six-county area is estimated at \$19 million. Expected benefits should make it a wise investment.



Land, big sky, and water from the mountains make up central Utah's storehouse.

Firm looks to SCS for location help

An international food packaging company relies on soil scientists of the Soil Conservation Service to help decide where to produce its fruit and vegetables and where to build its plants.

In fact, decisions in the use of soils are so important the firm employs its own soil scientist.

"The area soil scientist of SCS is the most useful person I deal with," asserted Walter Raitanen, soils specialist for the firm, Libby, McNeill, and Libby.

"Soils and their management affect every stage in fruit and vegetable production," he explained. "They also affect the timing of the harvest and the uniformity of the product."

Raitanen is a member of the research team of the firm's agricultural research center near Janesville, Wis. He carries the title of soil scientist. Investigations of potential production sites take him to many parts of the United States and to several foreign countries.

"The area soil scientist covers eight or so counties and is well acquainted with the soils—their problems and their good qualities," Raitanen said. "With him I can start getting down to business."

In seeking suitable production areas within a state, the company first refers to a general soil association map of the state.

"We contact the departments of horticulture and soils of the State University and other state offices for their recommendations," Raitanen explained. "We then go into the recommended areas for more detailed information. With guidance from the SCS soil scientist, we look at the general soil map of individual counties in the area to select the best soil associations. From the

published soil survey of each county we can get acreage data of these selected soils. If there is no published soil survey of a county, the SCS soil scientist usually has the information we need."

Raitanen emphasized that there are considerations other than soils that help determine where his company locates its plants and distribution centers. Among these is climate—the length of growing season, rainfall distribution, and chances of hail damage. Management has to decide, too, what location is best for transportation, labor, and marketing.

"But soils information is basic. We want a well to moderately well-drained soil—or, if irrigation is available, excessively drained soils will do. We also try to stay within a range of 2 to 3 percent slope."

According to Raitanen there are two prime considerations in choice of soils. These are ability to produce uniform, high quality fruits and veg-



A detailed soil survey aids Walter Raitanen of Libby's (left) and Everett C. Anderson of SCS in judging merits of a proposed plant site.

etables and ease of access to fields at harvest time.

"The one distinct difference between vegetable crops and, say, field corn or other grain crops is that most vegetable crops require a strict planting and harvesting schedule," Raitanen said. "Let's take sweet corn. It is planted in sequence over several weeks. When one planting is ready, it must be harvested that day. And the entire planting must be taken. With field corn, if part of a field isn't ready the whole field can wait.

"We have some crops that can wait—like pumpkins, beets, and carrots. But timing the harvests of peas, sweet corn, and green beans is very critical. Now that we're using mechanical harvesters, tomatoes are also getting on the critical harvest list. So we need uniformity in the soil and slope. We can't wait for a wet swale to dry up so we can get into the field."

The firm follows soil building practices, including planned rotations, on the land it leases and operates. Its aim, however, is to lease land and contract for production on land with a minimum of conservation problems. The deep black, nearly level, soils that surround their Janesville plant are typical. The company first seeks out large areas of desirable soils. Then, when it is established in an area, its fieldmen go out to contract with growers.

"This is where the detailed soils map really helps," Raitanen asserted, "and we can depend on SCS soil scientists and district conservationists of the individual counties for whatever information is available even when there is no published soil survey."

He cited an example near Rochester, Minn., where soil information was available only on the original field sheets prepared by the SCS soil scientist.

"The soil scientist told me it would be 5 years before the soil survey would be published. This looked like a real good vegetable growing county, but Libby couldn't wait 5 years," Raitanen recalled.

Raitanen purchased copies of the field sheets and cut them up to make a mosaic. Using the soil interpretations provided by the SCS soil scientist, he made a capability map indicating the desirability of different areas for growing vegetables.

"We make fertilizer recommendations to our growers, and the fieldmen also do the soil testing. Practically all residues are left in place. We farm some of our own acreage, too. The grower hesitates to make the more hazardous first and last plantings, so our farm manager takes charge of this. And then there are some (fussy) crops like lima beans that some inexperienced growers don't want to produce. An unhappy grower is mighty poor advertising," he added.

Soil Scientist Raitanen would like to see more rapid completion of the national cooperative soil survey by SCS and cooperating agencies. Shelves of his library are lined with published surveys. He waits eagerly for the next one. They're basic to decision-making for both the company and its growers, he declares.

"Who suffers if we get into the wrong area and the soils are unsuitable?" he asks. "We contract with the farmers. When they get a poor crop they're not making any return. We would have to close up and move."

Libby, McNeill, and Libby has its executive offices in Chicago, Ill. Its operations are carried out throughout the United States, the United Kingdom, Western Europe, and Puerto Rico. Like other companies that grow perishables, it finds the hazards great and the stakes high. It must, therefore, deal in percentages. Reliable soil information in the hands of good managers helps to keep those percentages favorable.—KENT ALVER-SON, information specialist, SCS, Lincoln, Nebr. ♦

Sign of the times

Increasing in popularity among SCS personnel is a new shoulder patch featuring the agency's official trademark. The patchworn here by Jim Mitchell of the river basins staff in Washington, D.C.—is embroidered in three colors on a black background.



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Contour strips in the nursery

To the nurserymen of Warren County, Tenn.—and there are 169 of them with a gross in sales of \$10 million—contour stripcropping is an important conservation practice.

Reducing soil loss and conserving moisture are principal reasons for its use, but there are other reasons, too, as noted by leading nursery growers:

"I am growing higher quality plants and very few culls as a result of stripcropping," reported Edward Porter, who mentioned also the appealing sight of contour strips on the nursery land.

"We might say that environmental improvement and beauty are extras we get from stripcropping," Hiram B. Stubblefield, head of a leading nursery, observed. "I consider the direct benefits—the reduction of soil loss, higher quality plants, and better moisture conditions."

"By using the alternate sod strips as roads we save countless hours of

labor in our operations," F. C. Boyd, Jr., vice president of another nursery pointed out. "We can pull alongside the nursery strips and load heavy balled plants easily."

D. P. Henegar added: "Warren County ships more nursery stock than any other county in Tennessee, and the plants are grown all over the world. Conservation of our basic resource is essential in protecting and improving this industry."

The chairman of the Warren County Soil Conservation District, F. L. Willis, said district records show that more than 1,200 acres of commercial nursery stock in the district is grown in contour strips. Other useful practices that the specialists of the Soil Conservation Service have helped the nurserymen plan and install include diversion terraces, sod waterways, and field boarders, he said.—WILLIAM G. REAGAN, district conservationist, SCS, McMinnville, Tenn.

Conservation in action . . .

No-till method suits Illinois farmer

Some form of conservation tillage is desirable for every farm in Illinois," observed Robert Holloway, who farms 560 acres with his brother in the rolling hills of Randolph County in southern Illinois.

Holloway planted 300 acres of corn this spring with his new "notill" planter, which seeds directly into stubble from the previous crop instead of planting on bare soil which would be subject to blowing or washing. It was his third year using the no-till method. Last year his net profit on no-till corn was \$93.45 an acre. That was by "farmer arithmetic," as he calls it, with no charges for interest on investment, machinery, taxes, or labor. His average yield was 101 bushels. He sold the crop for \$1.23 a bushel, giving a gross return of \$124.23 an acre.

Holloway's 4-year crop rotation goes like this: First year, wheat with clover sown as a cover crop; second year, corn in the clover with no tillage; third year, corn with no tillage; fourth year, soybeans following one chisel plowing.

Holloway also uses his no-till planter to plant sudex in permanent pasture. This he green chops for his 60-cow dairy herd.

Three years ago his 40 acres of no-till was the first in Randolph County. Last spring, some 7,000 acres was planted by the no-till method.

"The only hope we have of preserving our soils in this area of the country is to till the land as little as possible," said Holloway. "Just look at the siltation that is occurring in some of the lakes right in the flatest areas of Illinois if you don't believe we have erosion problems in the Corn Belt."

This conservation farmer is past president of the Illinois chapter of the Soil Conservation Society of America. He recently was appointed county executive director of the Agricultural Stabilization and Conservation Service in nearby Monroe County, Ill.—Jerry D. Schwien, information specialist, SCS, Champaign, Ill.

West Virginia

Before buying, board wants soil information

The Board of Education of Jefferson County, W. Va., uses soil information obtained from the Soil Conservation Service in selecting school sites.

"We want to know whether there are any site problems before we buy," School Superintendent Ted A. Lowery explained.

The board first considers a site on the basis of all other factors, Lowery said. Then SCS is asked for soil information on the site. The information is turned over to the architect for study.

Construction is to start this year on three sites chosen partly on the basis of soil information. Two elementary schools, at Bardane and Summit Point, will be built to consolidate seven schools of two, three, or four rooms each. A new central high school also will be built.— JAMES E. THORN, information assistant, SCS, Morgantown, W.Va.

Tennessee

District's first chairman enjoys a glance backward

Jason Crouch, long a supervisor of the Pickett County Soil Conservation District in Tennessee, was remembering . . .

"I was farming 42 acres when I got into work with the district," he said. "It took 5 or 6 acres per

head for my poor grade cattle. The sale of 15 to 20 hogs along with the few calves and the eggs from 100 hens was our total farm income in those days—in the early forties."

Crouch, the district's first chairman, stepped down from his long service on the district board in 1962. His son Coleman took his place.

Father and son now own and operate nearly 1,000 acres and have a herd of 100 registered Angus. About 250 acres is in pasture and hay, and 10 acres in cropland. The rest is timber, gradually improving, through selective harvesting.

"We now figure on 2 acres of pasture per mature cow," Coleman said. "We try to manage all our pastures properly by liming, fertilizing, clipping as needed, and following good grazing practices. We built three ponds for livestock water, planted 41 acres of steep or gullied land to trees, and converted gullied natural drainageways to grassed waterways."

Before Jason bought his first tractor in 1949, a team of mules had provided the power on the farm.

"One difference between our horse-and-mule days and now," Coleman chuckled, "is that now the horses don't do any work. My boy Jeff claims one horse and a nephew the other."

Jason likes to recall the time the Pickett County District won the Goodyear Award in 1958 as the outstanding district in Tennessee. He visited the Goodyear Farms in Litchfield, Ariz., representing his district.

"There have been many changes," the elder Crouch remarked. "For instance, our 1½ acre burley tobacco crop last year averaged nearly 3,500 pounds an acre. I can remember when I considered 1,500 pounds an acre a good yield. Also, 3 to 4 acres of corn fills our 65-ton upright silo. Changes like this prevail all through the district."

"Dad still gives me some fatherly advice on how the district should be run," Coleman said. "And if you want to see him mad, let him see a load of logs that have been cut too soon."

Although Jason is retired as a soil conservation district supervisor, he is still a leader in conservation in his county and area. Both Crouches were active in the organization of the 11-county Hull-York Lakeland Resource Conservation and Development Project, of which Pickett County is a part.—A. K. BOOHER AND B. Q. HARRISON, RC&D Project coordinator and district conservationist, SCS, Byrdstown, Tenn. •

Meetings . . .

A look at children

The White House Conference on Children to be held December 13-18 in Washington, D.C., will be concerned with the interests and problems of children aged 0-13.

Aim of the conference (held once each decade since 1908) is to define problems, seek new knowledge, evaluate past successes and failures, and outline alternative courses of action to face the Nation's new challenges.

The Conference on Children invited some 1,500 suggestions from state units, private groups, federal agencies, and individuals across the country. In attendance will be 4,000 delegates from national and state organizations and federal and state officials.

A "forum" structure was planned for the conference to avoid the mere reading of technical papers. The forums include: Individuality; learning; health, parents, and families; communities and environments; laws, rights, and responsibilities; and child service institutions.

At each forum the finest minds available from many disciplines and backgrounds—lawyers and educators, mothers and behavioral scientists, doctors, and administrators —will explore together the worlds of children, recommend ways to improve the quality of life for them. Followup regional conferences will be held in spring 1971 to implement recommendations made at the December White House Conference.

AAAS presses hard on environment

"Environmental Problems and Urban Affairs" and "Living World" are among several themes the American Association for the Advancement of Science will present at its annual meeting December 26-31 in Chicago.

Some of the subjects on the first theme are "Urbanization in the Arid Lands," "Reducing the Environmental Impact of Population Growth," "World Cities of the Future," "Is Population Growth Responsible for the Environmental Crisis in the United States?," "Systems Approach to Environmental Pollution," "Solutions to Environmental Problems," "Industrial Approaches to Urban Problems,' "Man's Impact on the Global Environment," "Public Policy for the Environment," and "Agriculture and the Quality of the Environment in the Seventies."

Subjects on the second theme include: "Some Mathematical Questions in Biology; "Parthenogenesis," "Plant Population Dynamics," "Water Quality and Fisheries in the Upper Great Lakes;" and "Human Ecology."

Engineers involved in environment

The American Society of Agricultural Engineers will hold its annual meeting December 7-11, Chicago, Ill. The major topics to be discussed include electric power and processing, food engineering, power and machinery, soil and water, structures and environment, and professional development.

Cities discuss their resources

The 44th annual congress of cities of the National League of Cities will have as its theme "The City . . . Its Resources, Systems, and Structure," and will be held December 7-11 in Atlanta, Ga.

Concurrent sessions will consist of eight panels: The property tax and alternatives; using dollars where they do the most good; urban government in metropolitan areas; city hall and its communities; new systems to assist in making better public policies; facilitating the introduction of new systems and products into city uses; labor-management relations; and the new urban politics and its meaning.

Manufacturers—all for quality

The National Association of Manufacturers will hold its 75th Congress of American Industry December 3-4 in New York. Theme of the meeting is "Ouest for Ouality." The Congress plans to explore, in depth, key facets of the drug problem and dissent within a lawful society. The association has long been interested in soil and water conservation and environmental improvement.

Dates and places

December 3-4, National Association of Manufacturers, New York, N.Y.

7-11, National League of Cities, Atlanta, Ga.

7-11, American Society of Agricul-

tural Engineers, Chicago, III.
13-18, White House Conference on Children, Washington, D.C.

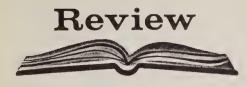
26-31, American Association for the Advancement of Science, Chicago, Ill. 27-30, American Agricultural Economics Association, Detroit, Mich.

January 1971 12-13, National Council of Farmer Cooperatives, Washington, D.C.

18-21, National Woolgrowers Association, Las Vegas, Nev.

24-28, American National Cattlemen's Association, Las Vegas, Nev.

17-21, National Association of Home Builders, Houston, Tex. ♦



Population, Resources, Environment: Issues in Human Ecology. By Paul R. Ehrlich and Anne H. Ehrlich. 1970. W. H. Freeman and Company, San Francisco. 383 pp., illus. \$8.75.

Paul Ehrlich, professor of biology at Stanford University, is best known for a paperback best seller, *The Population Bomb*, published in 1968. This year, in a large sized, hardcover volume with his wife, Anne, as coauthor, Dr. Ehrlich has expanded the thesis of the earlier book to include the total environment and its relation to overpopulation.

The book brings together materials from a great many sources, many of them periodicals and reports, and the reading lists at the end of each chapter furnish useful reference material. Dr. Ehrlich concentrates mainly on the deterioration of the environment and finds the outlook for the survival of man gloomy.

Like many of the new environmentalists, the Ehrlichs define the conservation movement in this country in preservationist terms. For the most part, references to Federal Government resource agencies are critical of programs and policies. The solution offered is for a super-Department of Population and Environment which would include a new and powerful office of Environmental Quality. This super-agency would monitor activities of USDA, HUD, and Department of Transportation, and other resource programs in the Federal Government.

The Ehrlichs maintain a rapid pace and high-key approach throughout. It is slightly disconcerting, then, to find toward the end of the book a small offering of aspirin to lessen the discomfort and assuage any pain the previous 300 pages have caused those readers who have not already left to cut their throats.

"It has been our aim to produce a . . . sourcebook for the study of questions related to population, resources and environment . . . Nothing in this book is intended to cause feelings of guilt, resentment or defensiveness . . . It is not our purpose to offend anyone ."

And as a further antidote, may I recommend the salty philosophy of Ian McHarg in *Design With Nature*.—KATHARINE N. MERGEN, *Information Division*, SCS, Washington, D.C.

New publications

The Practice of Water Pollution Biology. By Kenneth M. Mackethun. 1969. U.S. Dept. Int., Federal Water Pollution Control Administration. 281 pp., illus.; paper. \$1.50. As more and more workers in different professional fields find themselves involved with pollution-control problems, there has been a growing need for a practical treatment of the subject in terms usable by all. This book effectively meets this need.

"It is written principally for the biologist inexperienced in these activities," says the preface, "and for . . . others who are interested in broadening their understanding of this discipline.

"The book considers the many aquatic environments, their biotic constituents, and the effects of various pollutants upon them . . .

"Individual water quality constituents that affect the aquatic environment are discussed . . .

"Examples of field investigations, including data collection, analyses, interpretations and display are given for organic wastes, silts, toxic wastes, acid mine drainages, eutrophication, and radioactive wastes. Investigations in marine waters are discussed. Separate chapters detail the biology of municipal water supplies and sewage treatment. Biological nuisances and slimes are discussed, as well as their control."

The text is well supported by clear illustrations and an extensive reading list.

White House Conference on Food, Nutrition and Health, Final Report. 1970. (U.S. Govt. Print. Off.) 341 pp.; paper. \$3.00. The findings and recommendations of the Conference, convened in Washington, D.C., in December 1969 in response to the President's message to Congress on food and nutrition, cover a wide range of topics concerned with the adequacy, safety, and nutritional quality of the food Americans eat. One panel, considering the long-term trends in food production and supply, con-

cluded "that this country has the ability—provided proper Government food policies are followed—to produce all of the nutrients our expanding population will require for the foreseeable future."

An Economic Analysis of the Iowa Rural Renewal Area. 1970. USDA Economic Research Service Agr. Econ. Rpt. 181. 54 pp., illus. Economic trends in the 1960's in the Iowa rural renewal area, Appanoose and Monroe counties, show that the level of economic activity increased in the area but was clearly below the level for the state. These trends suggest that to bring economic opportunities in the area up to those available to other residents of Iowa, the area's annual rate of growth in the 1970's must be double the rate of the 1960's. New approaches to double the annual rate of growth include (1) increases in employment in the manufacturing sectors not related to agriculture and (2) comprehensive planning at the multicounty level.

TRAS, a Computer Program for the Projection of Timber Volume. By ROBERT W. LARSON AND MARCUS H. GOFORTH. 1970. USDA Agr. Hbk. 377. 24 pp., illus. \$0.40. Describes the use of the TRAS (Timber Resource Analysis System), a procedure developed to:

Update inventories to a common date for periodic national compilations of timber resource statistics; help analyze and interpret changes in the timber resource between surveys; and project future timber supplies under alternate management assumptions.

Facts About Resource Conservation and Development Projects. 1970. USDA Soil Conservation Service SCS-CI-14. [4] pp., illus. Tells how multicounty RC&D projects help communities improve natural resources and living conditions. The projects are locally initiated, sponsored, and directed. CI-14 presents the steps that local sponsors must follow in setting up an RC&D project, and outlines the technical assistance and financing available from USDA agencies in approved projects.

Artificial Reforestation Practices for the Southwest. By GILBERT H. SCHUBERT, L. J. HEIDMANN, AND M. M. LARSON. 1970. USDA Agr. Hbk. 370. 25 pp., illus. \$0.35. Recommends planting over direct seeding and gives instructions in (1) methods for production of planting stock, (2) site preparation, (3) planting of nursery grown seedlings, (4) broadcast sowing, and (5) plantation care and protection from fire, insects, disease, rodents, and browsing animals.

Teaching Soil and Water Conservation, a Classroom and Field Guide. By Albert B. Foster and Adrian C. Fox. Slightly rev. 1970. USDA PA-341. 30 pp., illus.

Recon...

America's soil is the "healthiest" of our resources as tabulated in the National Wildlife Federation's second Environmental Quality Index, but it is slipping because "we are not making wise use of our land."

Priorities in the report:

- (1) "We need a bold and comprehensive National Land and Water Plan . . . We need Federal encouragement to states to develop statewide zoning. We need local plans and zoning—all dovetailing together. And the people must have a voice in these decisions, must have a chance to help plan the kind of America they want. Public hearings must be held before decisions are made on issues affecting the quality of our environment.
- (2) "We urgently need an informed and aroused public, with a new ecological philosophy. As Americans, we will get the kind of EQ that we ask for, work for, vote for, and pay for. There are no simple formulas or magic solutions. Apathy is our only bar to success."

Rural towns take note

"When planning for development, there is a tendency to concentrate mainly on ways to attract new industry and retail business and thus create a flourishing community. This course, however, often bypasses the very important overlook of community services that will be needed by a larger population with progressive ideas. Many of the people communities hope to attract may have been accustomed to better facilities than some rural communities can offer. New citizens in a town expect schools to be good enough to prepare their children for college. They take it for granted that a good library will be close by. They expect adequate police and fire protection. They assume that the services

of health facilities, hospitals, and doctors are available for them and their families. Some of these community services are the very ones that are deficient in rural areas. And a community can't hope to draw and hold new people if it lacks any of these amenities of community life. Many of these services have to be planned well in advance . . . "—Farm Index, September 1970.

Put that in your pipes

"If you could bag the oxygen given off by 625 square feet of turf, it would sustain a grown man for a year."—GEORGE McVEY, scientist, O. M. Scott & Co., Marysville, Ohio.

Dairymen in Wisconsin dispose of cattle wastes by converting it to liquid form as valuable fertilizer.

The system consists mainly of tanks to store the raw manure to which water has been added. Machines agitate the mixture, and pumps draw it out when the liquid is to be used on cropland.

The trend in the state is toward larger herds, with fewer cows on pasture. About two-thirds of the manure produced by the confined herds—30 million tons or so—must be transported to the fields for fertilizer use.

Some farms, according to a survey by the University of Wisconsin in cooperation with the Economic Research Service, use the new system exclusively. Others are using it in combination with conventional methods. The study showed the system to be profitable for herds of more than 50 cows. Value of the liquid manure averaged \$32 per cow per year.

A better farm life

A recent recommendation of the "Goals for Louisiana Committee" compliments and challenges SCS and conservation districts, reports State Conservationist J. B. Earle. The goal reads: "Further effective utilization of technical, financial, and other assistance from all state and federal agencies and all industrial sources is a vital part of moving toward the goal of a better farm life."

"In addition to the continuation of basic and applied research and its dissemination, other pressing programs deserve a new emphasis. The thorough inventory of soil resources as provided by soil surveys in each parish encourages the optimal usage of land through informed and rational planning. Their completion would provide the basis for a well-knit, comprehensive, land use plan which would maximize the economic and social benefits of our land and other natural resources. A land use plan should provide for the most efficient development of (a) conservation and flood prevention projects, (b) outdoor recreational facilities, (c) watershed development projects, and (d) fish and wildlife habitats. Through these types of programs the future of rural communities will be enhanced and new jobs and improved services will complement the increasingly attractive advantages of an uncomplicated environment."

It's been said

"We might dig out and re-run the sermons of Pinchot and Bennett, thus relieving the current crop of evangelists of the obligation to awaken the public. After all, everything has been said before, and their energies would be more useful in doing the job at hand than in warning of the wrath to come."—Leland duVall, Arkansas Gazette, Feb. 20, 1970. (from article "It's Time to Use Know-How of SCS").

Do what you can

The President's Task Force on Rural Development reported that "If this is to be a happy and healthy Nation in the years ahead, our growing industry and our increasing population must spread out instead of continuing to pile people and industrial plants into compacted urban areas.

"It is in the rural countryside areas that we can find generous resources of clean air, clean water, living space, recreation, scenic beauty, transportation potential, tranquility and inspiration for tomorrow's people. And it is there that we can most readily and economically develop and preserve these natural resources in living harmony with man as our population expands in the generations ahead."—from The Report of the President's Task Force on Rural Development titled "A New Life for the Country."

From the Administrator:



Land and people

"Land use planning" is a phrase that conjures up many different pictures:

—Two men around a farmhouse kitchen table deciding what to do with one small field.

—A big-time rancher working out the best use of 50,000 acres.

—A conservationist and a housing developer considering ways to curb soil erosion and sediment on a 160-acre tract of sloping land in a builtup area.

—A major activity in small watershed projects and resource conservation and development projects.

—And a major assignment for town and city officials and regional, state, and multistate groups.

The Soil Conservation Service is a part of every one of these pictures. We bring to the scene a solid record of on-the-land accomplishments, many kinds of resource surveys and studies, and the expertise and know-how built up over 35 years of land use and conservation-treatment work.

We also bring the basic concept that you cannot plan for land without planning for water, and you cannot plan for either without planning for—and with—people. The technical concerns of resource planning may differ enormously at the different levels of work. But the bedrock belief that any planning worthy of the name must consider people and their total natural environment is exactly the same whether the atmosphere is a 40-acre cornfield or a 40-story office building or—for that matter—the halls of Congress.

Last year, we helped more than a million conservation district cooperators; compiled and furnished more than 6,000 inventories and evaluations of resource data, and made major inputs into 900 resource plans.

Pick almost any spot on the map and we are—or were—there, with soil surveys, watershed studies, day-to-day action in helping people improve their environment through better use of resources.

To name a few:

-We provide Maine's Environmental

Improvement Commission with needed resource information for proposed new building sites.

—We provide soil and hydrologic information for the seven-county Southeast Wisconsin Regional Planning Commission. The commission estimates the soil information alone can save Wisconsin people \$300 million in the next 25 years.

—We are working with the Northeast Illinois Natural Resource Service Center, which provides a wide variety of resource information to citizens and government agencies. When fully operative, the center's computerized NARIS system (Natural Resources Information Retrieval System) will provide useful facts about every 40-acre land area within the eight counties involved.

All this planning work is done in full partnership with local conservation districts. Thousands of men and women who lead district programs contribute to the conservation planning and action job an unrivalled grass-roots knowledge of land and water management.

From half a farm to half a Nation, SCS has been involved in land use planning for 35 years. Today there is concern for a national land use policy. We'll be involved in that too—with basic resource information and the proved philosophy that land and water planning should be done for—and with—people.

Kenneth E. Grant

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It's all the same . . .

Whatever the use of natural resources, some basic things apply—ground rules, if you will. Under apple orchard or apartment complex, the soil's characteristics need to be accounted for; the way water will move across the property; and a host of other considerations.

Helping see that more of these basics are used in a fast-changing Nation is the work of SCS, outlined in several articles this month.

We begin with Administrator Grant's page because it sets forth some ideas that SCS and district leaders and many others need to ponder early in the game. The result of some hard SCS thinking is the next topic (p. 124), a long-range plan for the 1970's and beyond. Our annual report (p. 134), tells the whole story, reinforced by specific examples such as gully control in Alabama (p. 128), skiing facts from snow surveys (p. 132), and help in guiding fast urban growth (p. 130), and keeping sand dunes still in California (p. 126).

COVER: A quiet winter scene, and an oversnow machine that must be fun to drive but serious business for SCS snow surveyors who help forecast for western water users how much water this mountain snow will make next spring.

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

CLIFFORD M. HARDIN, Secretary of Agriculture KENNETH E. GRANT, Administrator, Soil Conservation Service BEN O. OSBORN, Editor GEORGIE A. KELLER, Production Editor

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A time to take stock

The first year of a new decade has gone. It was a year in which interest and concern about the state of the natural world and man's treatment of it became widespread. A clear majority of American citizens now look at their surroundings and at community decision-making in a new light.

It was a year during which important action took place in legislatures and executive departments—action that gives both business activity and conservation work a far different perspective than either had just a few years ago. The quality of this Nation's environment will be given long-term and pervasive attention.

What is the perspective? Americans want many things from their environment—and they are becoming more vocal in expressing their interests. They want a good food supply. They want clean and dependable water supplies for home and industrial use. They want clean air to breathe and see the world through. They want a horizon uncluttered by society's waste products. They want abundant outdoor recreation and protection of wildlife and scenic areas.

They want all these things—and they also want new homes, new automobiles, new highways, more of the manufactured goods that make up a better life.

Some of their wants work against one another. Achieving both material goods and a higher quality environment is a challenge. It requires some re-thinking on the part of the citizenry and of the government agencies and business firms that serve the public.

They need to reconsider their programs or operations in detail. Do they meet the "public interest" as well as they might? Do they try hard enough to wade through the maze of individual opinions and special-interest group statements—and the concerns of less vocal citizens—to assess the real public interest?

Do they make or work on the right things—and in the right order? Do they solve problems without creating others somewhere else? Do they look ahead to helping society

meet positive aims as well as patching up America's faults?

The Soil Conservation Service has been re-thinking its role and its programs, as evidenced by a long-range plan that is discussed elsewhere in this issue. The process will not stop with a printed document—we must continue to reassess our helpfulness to America.

Most of the Nation's 3,000 conservation districts have taken a similar look at themselves and updated their long-range programs as needed. This, too, must be a continuing process—not a one-shot affair.

The Nation's businesses, communities, and private landowners need their own assessment of where they fit in a fast-changing world.

We have entered the decade of the 1970's. We can come out of it a better Nation by many standards of measurement.

Kenneth E. Grant

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plan for the future

By Floyd W. Campbell
Director, Program Planning Division
SCS, Washington, D.C.

In 1970 the Soil Conservation Service looked appraisingly at the America of the future.

Its aim? To determine how soil and water conservation can best help to shape a better America.

Its concern? We are living in an era where scientific and technological change is bringing rapid shifts in social values and living patterns. These shifts are bringing with them new concerns about man's environment and the quality of American life. In turn, these concerns bring a new urgency to conservation efforts. They bring an urgent need to anticipate future needs so that society—and agencies such as the SCS—can be in command of change and respond swiftly and constructively to new needs.

Leaders of SCS work in every state tried—with all the imagination and realistic foresight at their command—to put everyday concerns aside and place the future soil and water conservation job in perspective and focus on the direction it should take in the years ahead. From their discussions, a group of Washington, D.C., and field personnel prepared a draft plan. That plan was reviewed by all state conservationists, and a revised draft is now being reviewed by a wide segment of SCS people.

The mission

The outcome of the effort by spring 1971 will be a long-range plan to guide SCS in reaching its mission:

To assist in the conservation, development, and productive use of the Nation's soil, water, and related resources so that all Americans can enjoy—

- Quality in the natural resource base for sustained use.
- Quality in the environment to provide attractive, convenient, and satisfying places to live and work.
- Quality in family standards of living based on community improvement and adequate income.

Objectives

These three objectives reflect the concern of SCS for relating resources to the needs of people. They represent the focus for the long-range plan.

In a real sense the long-range plan clearly sets forth the reasons why the Soil Conservation Service exists. It lays out the need and charts the course for conservation work in the decade of the 1970's and beyond. It outlines the specific role of SCS in that work. It takes into account the social and economic setting for conservation. It summarizes the soil and water conservation needs of the Nation as they relate to SCS objectives. It sets forth the broad goals, principles, policies, plans, and institutional arrangements needed to reach these objectives. At the same time, the plan recognizes that goals can change with time. It has built in flexibility to accommodate changing needs.

A systems approach

Structuring the long-range plan has been a key effort. Long experience in helping watershed project sponsors and other groups and individuals has convinced SCS that any soil and water conservation action is a part of complex interrelationships among resources and among people.

The framework decided on for the long-range plan, then, was the "systems" concept. It tries to relate the objectives, benefits, causes, effects, resource management systems, and program activities to one another in a comprehensive nationwide approach.

It brings out the relationships and mutual concerns between rural and urban people, landowners and land enjoyers, and units of government and the people they serve. It relates the characteristics of natural resources to the action of men and machines on them.

In this setting we recognize that progress toward the objectives demands changes in resource use and improvements within resource management systems. A resource management system, in a broad sense, is the total of changes, improvements, and maintenance that takes place in any geographic area. The area may be a region, river basin, watershed, town-and-country area, urban-suburban area, farm, or other unit. In developing a resource plan for any geographic area the focus is on changes and improvements that will meet objectives of the concerned people.

Subsystems

To help us focus on these concerns in the long-range plan we have broken the resource management system for any area into subsystems—for example, land management, water management, stream management, wetland management, and waste management.

The land-management subsystem is further divided on the basis of primary use. It is made up of cropland, pasture, range, woodland, recreation-wildlife, urbanizing land, environmental corridors, transportation and transmission corridors, and surface mining.

Benefits and effects

In the plan, benefits are defined as the values to society that result from changes and improvements in resource management systems. Natural resource benefits express the quality condition of the resource as related to standards for sustained use. For example, the plan shows that less than 50 percent of the present cropland meets quality standards for sustained use to meet food and fiber needs. The benefit goal for cropland quality is to increase that percentage.

Other terms used in the plan to express natural resource and environmental benefits include land, water, and air quality; fish and wildlife habitat quality; natural beauty; recreation opportunities; and environmental quality for town-and-country and urban-suburban areas. Quality in family standards of living

is expressed as job opportunities and economic efficiency.

Bridging the gap between the benefits and the changes or improvements in resource management systems are the conservation effects that result. Conservation effects are defined as the physical results, in contrast to the social, economic, and environmental results that express benefits.

The conservation effects are expressed as erosion control and sediment reduction, water storage, improved plant cover, drainage improvement, fish and wildlife habitat improvement, water conservation, pollution prevention and abatement, flood reduction, and improvement in patterns of resource use. Goals for conservation effects, and actions to achieve these goals, have been spelled out in the plan.

Action programs

The long-range plan also contains goals, policies, and plans for major program activities that involve SCS and other institutions and organizations. These program activities include resource technology development, surveying and monitoring, resource conservation planning, installation and maintenance assistance, and information and management support.

Program activity goals signal important changes in direction and emphasis. For example, an improved system for monitoring natural resource conditions is planned. Monitoring will focus on the quality condition of natural resources. It will be concerned with measuring the present resource condition, and with measuring the impacts caused by changing uses and improvements in resource management systems. Conservation standards will be needed to serve as benchmarks for monitoring resource conditions.

Working together

In the plan we recognize that widespread concern about man's environment should open participation in soil and water conservation to everybody. Society needs to be more concerned about the future consequences of current decisions. The Nation's local conservation districts and SCS long have realized that getting people to work together is the only way to achieve conservation and resource development work and insure the continued well-being of our country. As people work together they gain a fuller understanding about the quality of their environment and the condition of their natural resources. Their decisions then are more likely to help them attain their goal of a high-quality life. It is the intent of SCS to promote and strengthen this "working together" approach.

The long-range plan not only charts new courses for the Soil Conservation Service but also retains all those traditional goals, activities, and relationships that will continue to be meaningful in the 1970's. The result is a comprehensive look by many people at the long-range effort of SCS—a look hopefully that will help us all serve the changing needs of people in their drive for a better life.

Grass to the rescue . . .

Plantings halt march of Bodega Bay dunes

By Charles E. Swisher
Soil conservationist, SCS, Sebastopol, Calif.

Bodega Bay is a small port town of 500 people, 40 miles north of San Francisco. The bay itself, formed by an arm of land that juts protectingly out into the Pacific, is a picturesque haven for fishing boats and assorted seagoing pleasure craft.

It's the last place you would expect a need for grass and for Soil Conservation Service specialists. But grass and the know-how for using it may have saved a bay, a town, and a fishing fleet.

Blame that picturesque phenomenon—the shifting, barren, coastal sand dune—for the near-fatal threat to the economy of Bodega Bay. Credit local, state, and federal cooperation for putting the halter on this threat.

A veteran fisherman described how it was back in the early 1920's: "You couldn't see across the bay when the northwest wind blew."

It wasn't just the stinging, blinding misery. The windborne sand was filling the bay and closing off the channel. For boats to pass from docks to ocean fishing water, the channel had to be kept open. Any community that is about 50 percent dependent on fishing and 40 percent on water-oriented tourism can't afford to do otherwise. (About 10 percent of the economy is farmbased.)

The entire bay once was open. Those who can remember say it was a mile across, protected by the hook of land. Coastwise ships picked up and delivered freight and, as late as 1950, up to 600 fishing and pleasure boats used this port.

Bodega Bay's seaward-dune area once was covered with bush lupine, native grasses, and other coastal plants. Late in the 19th century, ground-covering plants began to disappear under the continuing pressure of grazing animals. More than a thousand acres of seaside "desert" developed.

Unprotected sand was picked up by wind. Slowly it filled the bay including the ship and boat channel. After a storm, it was not uncommon to find ½ to ¾ inch of sand on decks of boats anchored in the bay.

The U.S. Army Corps of Engineers, charged with keeping navigation waters open, dredged the channel three times, but sand kept on filling the waterway. Keeping the channel open became impractical. In 1952, the Corps was ready to throw in the towel.

The sand came from a strip between bay and ocean—a strip about 1½ miles long and a mile wide. Mostly barren dunes occupied the strip. At the time, half this land was owned by farmers and half by the California State Division of Parks and Beaches.

Most private owners were members of Bodega Bay Grange—an organization interested in community affairs. It was natural to seek help there. Since the area was within the Gold Ridge Soil Conservation District, it also was natural to ask the district for help.

Grange officials asked district directors—President Ezra Briggs, W. K. Heathorne, Charles Goodale, Lloyd Dillaha, and Earl Schock—whether a program could be worked out to control the drifting sand and save the community.

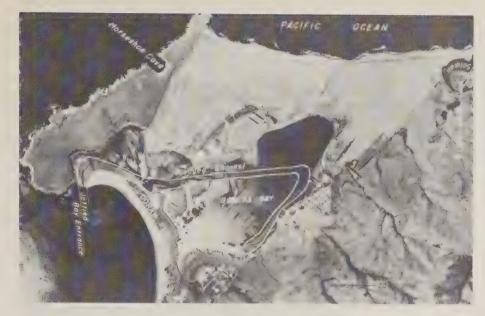
The answer: Yes.

California Parks and Recreation Department and the Gold Ridge District worked up a contract to cover project costs. The Bodega Bay Grange offered help with labor. SCS would supply technical help.

SCS district conservationist then was the late Warren W. Wood.







Walter R. Weeks, conservation technician, was his assistant. Their job was to find ways of establishing plant cover on the dunes.

Wood gathered local information about previous work on dunes. The SCS plant material centers were a primary source. Weeks went to Florence, Oreg., where similar dune work was underway. He bought a tomato planter for planting clones of grass.

At Bodega Bay, Wood learned that early in this century farmers bordering the dunes found a grass—European beachgrass, *Ammophila arenaria*—that would grow in

sand and tie it down. The grass had been introduced as a sand binder at San Francisco's Golden Gate Park. It was growing at various places along the Pacific Coast.

Bodega Bay farmers acquired some clones of the grass and began planting it on dunes near their land. The job was only partially successful—but valuable information resulted.

With what had been learned and with alterations on the tomato planter, Wood and Weeks launched a program of stabilizing the sand dunes of Bodega Bay. A six-man crew under Weeks' supervision dug

grass from old plantings on nearby farms and on state park land, separated them into clones, and bundled them for use in the planter. Four people planted, one drove a tractor pulling the planter and one kept the planter supplied with clones.

Acre after acre of sand dunes was planted. This had to be done in December and January to insure sufficient moisture.

Hummocks were smoothed with a bulldozer in places so the planter could get over the ground.

The planned pattern planting was for 75,000 clones of beachgrass an acre, 12 inches apart in rows spaced 15 inches apart.

Wind blew out the grass in some areas despite the most careful effort in planting, and other areas could not be smoothed enough for planting. In blowouts and rough areas, Boy Scout, Girl Scout, and Grange volunteers planted the clones by hand.

A lesson learned was that fertilizing at the time of planting and each second year thereafter made the grass grow faster and stand up better under dry summer weather.

European beachgrass not only thrives in blowing, shifting sand—it needs this condition to stay vigorous and continue growing. But the object was to stabilize the sand, and stop it from shifting and blowing.

Grass on the dunes: With a converted tomato planter (far left) this crew of six can cover 30 acres in a planting season. Two years later a good stand is up (left); but where wind has blown out the seedlings, replanting is done by hand (below). Result is a picturesque flat (far right) protected from threatening dunes.





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Success in this meant the beachgrass would lose its vigor. Fertilizer is needed to keep it growing.

Many trees, shrubs, and grasses were tested to supplement beachgrass as the sand became stabilized. Monterey cypress, Myoporium, bush lupine, ice plant, false brome, and Veldt grass showed promise.

Only a small amount of the original thousand acres remains to be planted. Most dunes are covered lushly with grass. Secondary plantings fill in between the rows and help hold the sand.

Blowing sand no longer threatens to close the channel in Bodega Bay. The channel was dredged again in 1968, and Sonoma County installed a launching ramp.

The state now owns 90 percent of the beach and has made it part of Sonoma State Beach. Picnic and camping areas, roads, and other recreation facilities are planned. The future of the community is assured. •

Gullies yield to team effort

Control of gully and critical area erosion has become a major objective in the Wiregrass Resource Conservation and Development Project in southeastern Alabama.

Farmers, city and county government, and state and federal government are joining local soil and water conservation districts to tackle a problem that for many years has plagued the Wiregrass area.

The problem: 3,000 caving gullies, 2,700 miles of unprotected highway roadbanks, 20,000 acres of strip-mine spoils, and inadequate cropland water-disposal systems that are pouring tons of sediment into lakes and streams each year.

Not only is this erosion damaging valuable upland, but it also is killing hundreds of acres of hardwood timber growing on the bottom land. It has practically eliminated fish and wildlife habitat in the area's creeks and rivers.

A program to reduce the erosion menace was initiated in 1969. The sponsors, county Agricultural Stabilization and Conservation committee and soil and water conservation district supervisors, joined to formulate a special gully-control practice.

More than 100 landowners stabilized about 350 acres of critical area with cost-sharing assistance of the Agricultural Stabilization and Conservation Service. SCS specialists provided engineering assistance through local districts, designing and laying out 27 grade-stabilization





structures, and recommending application of seed and fertilizer for proper vegetation.

In 1970, all nine counties in the Wiregrass Project participated in the program. About 125 applications totaling \$135,000 were approved.

In some counties and locations, the enormous size of some gullies prevents their treatment under the Agricultural Conservation Program. But if more than one individual is involved and the cost-benefit ratio is acceptable RC&D funds may be used to install the structures. Three gullies of this type have been treated in Dale, Coffee, and Barbour counties.

City and county governments have moved into the act. In the city of Ariton in Dale County a large gully threatened to undermine several buildings. SCS engineers worked out a plan to stabilize the area. The county provided labor and equipment to fill and slope the gully as planned, local farmers provided seed, fertilizer, and mulch, and the

Alabama Highway Department installed a concrete gutter and pipedrop outlet to carry the water to a controlled grade.

At Camp Meadow Woods, the area Girl Scout camp in Houston County and the Houston County District furnished burmudagrass sprigs and labor to spread the fertilizer and plant the grass. The Girl Scouts planted Arizona cypress trees on a part of the critical area.

SCS did the survey and design work and supervised the installation of all gully-control work completed in the project area.

Dramatic progress also is being made on roadbank stabilization. Covington, Barbour, Dale, Geneva, Pike, and Crenshaw counties have all completed RC&D contracts to stabilize critical areas on about 75 miles of county roads. About 200 acres have been treated. RC&D funds were used for seed, fertilizer, and plant materials while the county governments provided labor and equipment to fill and shape the areas, prepare seedbeds, and plant the grass.

Progress also is being made on mined-land reclamation. A local contractor in Pike County is working with landowners to complete 300 acres of land smoothing and tree planting on erosive spoil areas. New legislation signed by the Governor in 1969 requires that all new-mined areas be smoothed and planted to trees by the mining companies. With renewed interest in erosion control and favorable legislation on the books, the RC&D sponsors expect continued progress in mined-land stabilization.

The Wiregrass RC&D sponsors, USDA agencies, city, county, and state governments, and individual land users have a renewed interest in erosion control in the Wiregrass area. Efforts of these agencies and individuals are saving valuable land and curbing one of the area's most damaging pollutants, sediment.—CAMERON F. LYLE, project coordinator, SCS, Wiregrass RC&D Project, Ozark, Ala. ◆





A huge gully that threatened to undermine a paved road (above) was fixed with a series of dams with concrete flume overfalls (below).

The trash-filled gully that District Conservationist T. R. Nabors views (above) now is a bermudagrass field (below).

Facts for urban growth

By Thomas P. Helseth

State conservationist, SCS, Berkeley, Calif.

In California—where population has doubled every 20 years for a century—regional, county, and city officials have turned to the soil survey for information essential to their planning work.

For three decades soil surveys made by the Soil Conservation Service have been a primary tool in halting erosion and promoting good land use on farmlands. But soil surveying geared to agricultural needs in California has been lagging behind the demands of urban land use planners for maps and data. To speed fieldwork and publication of soil surveys, several California agencies have been helping with funds. These agencies have committed more than a quarter of a million dollars toward soil survey speedup. Amounts contributed have varied from \$750 to nearly \$100,000.

In California, galloping urbanization has had a serious side effect—inflation of land values raising taxes and often driving farmers off prime farmland. California agriculture yields \$4 billion a year in income, and losing large amounts of cropland is as serious as losing factories and businesses.

To meet this threat, the California Legislature passed the California Land Conservation Act permitting counties to set up "agricultural preserves." Landowners in preserves may have their land taxed on an agricultural basis if they agree to restrict land use to agricultural purposes. Soils information helps county officials judge which land is eligible

for this preserve status.

There also is a growing demand for identification and preservation of land in open space. Soil maps are proving helpful in long-range planning to fill this need.

Another concern involves soil erosion and water pollution from urban development as well as from farming. Soils information permits conservation planning to keep soil from eroding and polluting rivers, lakes, and harbors.

San Diego County, said to be the fastest growing area in California, has made a substantial financial contribution toward publication of the soil survey reports including special interpretations needed for planning and zoning. The County Planning Department also has contributed staff help.

"There's a real awareness in San Diego County that open space must be saved," said Senior Planner Roy Griffin, county project manager for soil interpretations. He notes a trend toward conserving farmland for open space. Another need is for the kind of soils information that will help prevent residential developments on unsuitable soils.

Four soil surveys have been completed and three published in the Los Angeles area with local cost and work sharing. Interim reports were published for the Saugus-Newhall and Malibu areas since the information was needed before the final publication because of heavy population growth.

The Antelope Valley soil survey.

which covers the Saugus-Newhall area, and the Ventura soil survey were published last year.

Agriculture in Monterey County brings in more than \$150 million annually, according to Melvin G. Bakeman, assistant to Planning Director E. W. DeMars. With what's happening to the north and south—in the San Francisco Bay area and the Los Angeles area—county supervisors and planners understandably want to avoid chaotic development.

"Our master plan—based on soil surveys—shows better soils reserved primarily for agricultural use," Bakeman said. About 275,000 acres are zoned for agriculture. The county and other agencies made substantial contributions toward completion of the soil survey fieldwork.

Santa Clara County on the southern rim of San Francisco Bay has real growing pains. Prime farmland is being urbanized rapidly, creating a variety of land use problems. The County Flood Control and Water District and the Black Mountain, Evergreen, and Loma Prieta soil conservation districts helped with the early printing of a special soils report for the county. This special report and interpretations were published with the aid of a planning grant from the Department of Housing and Urban Development and staff help by the County Planning Department.

City officials in the county are analyzing subdivisions on the basis

of this interim soils report. Much of the county is outside incorporated areas, but presumably the remaining land will be annexed ultimately. Without proper planning based on soils information, the cities could inherit more land problems, explained Arthur Ogilvie, senior planner of the County Planning Department.

Yolo County's early soil survey lacked details needed for present-day planning and development, according to Robert Peterson, county planning director. The current survey, for agricultural use, would have taken another 10 years to complete. Yolo County and the soil conservation districts in the county entered into an agreement with SCS in 1963 to accelerate the

field survey. The county also provided equipment and personnel to dig soil survey pits. SCS added two scientists, making a four man survey party. As a result, final field maps were completed in late 1966. The general soil map was published in 1969.

A major concern in Yolo County—mostly rural country northeast of the San Francisco Bay area—is protection of farmland from the pressures of nonfarm use. The county acted to set up agricultural preserves under the Land Conservation Act. John McCoy, senior rural appraiser in the Yolo County Tax Assessor's office, says applications for preserve status—and the lower taxes—are checked against the soils report to

determine whether the land is prime for agricultural use.

Several multicounty organizations have been formed in California to deal with planning, development, and environmental problems that cross county lines. Among these is the Association of Bay Area Governments covering nine counties. The association cost-shared a general soil map of the area for use in regional planning.

Others that have contributed toward soil survey speedup and publication are: Fresno, San Mateo, Nevada, Placer, Solano, Santa Cruz, and San Bernardino counties and the U.S. Army (Sierra Army Depot, Lassen County).

Galloping urbanization means quick planning decisions and need for resource information on which to base them.



Skiing and snowmobiling are among the fastest growing forms of recreation in the West. Snow is necessary for both.

A good ski area should have dependable snow year after year. It should have enough snow to open around Thanksgiving in most years and by Christmas in all years.

Not all mountain areas can meet this requirement. Storm patterns and topography combine to provide highly variable snowfall patterns throughout the West.

In Montana, snow-survey data

have been used to delineate areas that have adequate natural snowfall for development of winter sports sites. The Montana Snow Survey Unit of SCS has prepared maps of the area for SCS offices in the state.

Criteria to develop the maps were based on skiable snow accumulations by mid-December in 19 out of 20 years with normal opening in late November. The maps are only an aid, of course.

Landownership, population, transportation, available capital, terrain, and wind also are important considerations in selecting a specific site for a ski area. The map shows areas with adequate snow and the minimum elevation that should be considered for the basic facility.

When a specific site is selected and a group is interested in development, SCS prepares a snow-evaluation report for the site on request. Actual snow measurements then should be made since weather conditions in mountainous areas are unstable. Terrain and storm patterns can create "rain shadows," or areas that have less precipitation

We know about snow

By P. E. Farnes Snow survey supervisor, SCS, Bozeman, Mont.



than comparable areas nearby.

Long-term snow-survey records can be used to show variation in snow accumulation over long periods.

SCS and cooperating agencies have been making snow surveys in the West for more than 30 years, to forecast the streamflow in spring and summer.

These forecasts aid in farming, regulating reservoirs, scheduling releases of water for pollution abatement and fisheries improvement, determining municipal and industrial

water supplies, and other uses.

Collected data also provide the basis for other analyses. Snow affects wintering of big game animals, increases roof loads on structures, and affects street and highway maintenance costs. Long-term measurements also provide a monitor of any change in mountain precipitation that can result from increased population and industrial activity.

The snow measurements now have another use—to aid in developing good ski areas for recreation and new income for the West.



SCS snow surveyors travel to snow courses on snow machine (right), skis, snowshoes, and by helicopter to measure the water stored in the snowpack.

Good place for a major ski area (left), or not dependable? Long-term snow measurements can help tell.

Surveyors (below) measure the winter's accumulation of snow and its moisture content.





In service to America

Summary of activities of the Soil Conservation Service for fiscal year 1970

In the first year of the new decade, the Soil Conservation Service assisted a growing number of units of government in coping with town and country growth and land use change.

The conservation principles that benefit farm, ranch, and forest lands are proving equally effective for resources in residential, industrial, transportation, fish and wildlife, and recreation uses.

New emphasis was placed in fiscal year 1970 on efforts to plan conservation action on an areawide basis; to improve the quality of living and increase job opportunities in rural communities; and to implement the growing desire of Americans to keep their Nation beautiful.

Meanwhile, requests for technical assistance on farms and ranches remained at high levels from rural and suburban land owners and users in 3,026 local conservation districts.

By the end of fiscal year 1970 the districts had 2.2 million cooperators who were applying and maintaining soil and water conservation.

Assistance to communities

The number of responses by SCS to requests from state and local units of government climbed to 61,200 in 1970, a jump of more than 10,000 over a year ago.

SCS specialists provided 6,511 resource inventories and evaluations to planning commissions or other agencies of local, state, or federal government. They made field investigations and recommendations on land use and treatment of proposed sites for 1,559 public fa-

cilities such as schools, hospitals, sanitary landfills, transportation facilities, recreation areas, and water and sewer facilities.

A total of 303 land use regulations, zoning ordinances, sanitary codes, and building codes or standards were issued or enacted by government bodies—with soil surveys and other technical information provided by SCS.

Assistance to individuals

SCS conservationists and specialists provided 3.1 million technical services to 1.1 million individual land owners and users in conservation districts. SCS helped prepare more than 75,000 conservation plans covering nearly 28.7 million acres and helped revise 36,328 plans covering nearly 22 million acres. More than 575 million acres of private land in the United States now is covered by plans for resource protection and proper use.

Nearly 700,000 district cooperators applied one or more conservation practices during the year, raising the total of land adequately treated for its conservation needs to more than 587 million acres.

Resource conservation and development

SCS assisted 55 Resource Conservation and Development projects. Thirteen others were being planned with SCS help. The combined area of the 68 projects totals 244 million acres.

Completed project measures the specific activities planned by local citizens to improve the economy and the quality of living in the project area—totaled 2,249.

Fifty-one applications for project assistance in the program are awaiting authorization. They represent a total area of 189,653,000 acres.

In fiscal 1970 local citizens received technical assistance, loans, and other help for more than 7,000 measures with tangible community benefits. The actions dealt with a broad variety of problems and opportunities for the use and development of soil, water, and related resources.

Great Plains Conservation Program

In fiscal 1970 another 5.3 million acres was placed under Great Plains Conservation Program contracts as 3,038 additional farmers and ranchers in 440 participating counties began installing needed conservation treatment on their land.

More than 37,000 land owners and operators across the Plains now have completed or are under contract to complete conservation on 67 million acres.

Action in watershed projects

In fiscal 1970, the 1,000 small watershed project in the Public Law 566 program was approved for operations. The program, one of the early Congressional efforts in environmental improvement, was designed originally to help local sponsoring groups control erosion, slow sediment production, and prevent floods. Water supply, recreation, fish and wildlife, and other multiple-purpose features added since then have provided a means for people to meet broad and positive community aims. They also have resulted in

many new jobs in rural towns. Construction and economic activity prompted by the program already have produced an estimated 57,000 new jobs.

Since its inception the watershed program has kept an estimated 13 million tons of soil out of streams and reservoirs and off bottom lands.

Project reservoirs have stored and protected water supplies for 281,-000 people.

Other significant benefits include:

—320 million dollars of agricultural and nonagricultural flood damages prevented.

—120,000 acres of land and water-habitat improvement for fish and wildlife.

—10 million visitor days of recreation provided annually.

Soil surveys

With demand for soil survey information sharply on the increase, SCS sent 40 new surveys to the printer in 1970.

Soil scientists in the National Cooperative Soil Survey mapped 43 million acres in the year. Total acreage now mapped is 837 million.

Use of soil surveys is expanding rapidly among town, city, county, and regional planners and among engineers, architects, and sanitary and zoning officials. Use of soil surveys for farm, ranch, and woodland planning has remained at a high level.

Snow surveys

SCS made marked progress in 1970 toward the time when, through automatic telemetry, it can obtain in any given time schedule snow depth, water content, soil moisture, rainfall, wind velocity, and relative humidity data to forecast water supplies for Western States.

Six new automatic telemetry stations were installed in Utah and another in Idaho. The number of stations in the snow-survey automatic network now is 78. Another station is being installed in Colorado.

SCS is working with atomic-

energy groups to evaluate a new isotope unit that shows promise for providing more detailed information on snowpack and related conditions.

River basins

River basin studies are providing needed information for state water plans, comprehensive river basin plans, river basin commissions, regional planning commission efforts, regional development plans, and other activities involving soil and water resources on a regional or subregional basis.

In 1970 the Department of Agriculture, with SCS providing leadership, carried on investigations in 64 river basins. Nineteen of these are comprehensive interagency studies being coordinated by the Water Resources Council under the Water Resources Planning Act of 1965.

Requests for assistance by SCS in the cooperative river basin study program (Type 4) continue at the rate of six or seven a year.

Cropland treatment

Farmers made significant progress in the use of modern conservation systems, particularly minimum tillage. They planted an estimated 7 million acres in 1970 under this new concept of planting directly in a ground cover of crop residues, in one trip across the field. Five years ago, less than 10,000 acres was planted in this way. Various methods of minimum tillage can cut soil erosion 65 to 95 percent.

Use of terracing to control water flow across sloping land continued strong, with landowners constructing more than 30,000 miles of terraces during the year. Nearly a fourth of the total was in parallel terraces, which are well adapted to today's large and powerful farming equipment.

Grazing land

Proper grazing use, planned grazing systems, and fertilization gained during fiscal 1970. Proper grazing use was practiced on more than 70 million acres and rotation deferred

grazing on 3.7 million acres. More than 3 million acres of pasture- and hay-land planting was reported, and 507,000 acres of range seeding. Pasture- and hay-land management now on the land increased nearly 6 million acres to a new total of 54,-396.771 acres.

Woodland

District cooperators planted trees according to conservation plans on 341.539 acres during the year and made direct woodland seedings on 11,921 acres. They planted 42,580 acres of farmstead and feedlot windbreaks and 3,559 miles of field windbreaks. Woodland improvement totaled 473,135 acres, and 60,024 acres was shifted from cropland into woodland use. Woodland harvesting was improved on 1,383,210 acres. A growing number of woodland owners, however, are less interested in production of wood crops than in the recreation, natural beauty, and other qualities of a stand of trees.

Developing information on how different kinds of soil respond to woodland use is a continuing SCS effort. An automatic data processing subsystem has been set up for storing, summarizing, and retrieving soil-site index information. The records already available now are being coded for input into a computer data bank.

Wildlife land

Wildlife habitat management was practiced on more than 5 million acres, an increase of nearly 25 percent over last year, and wildlife wetland management was practiced on nearly 400,000 acres.

Fish farming

Interest in onfarm commercial production of channel catfish continues to grow in many states across the Nation. SCS gave technical assistance during the year to thousands of landowners for establishing catfish ponds or raceways. Other landowners have requested SCS help in growing trout for processing or recreational fishing. Both kinds of

Summary of Progress, Fiscal Year 1970

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress items	Total reportable progress	Cumulative to June 30, 1970	Progress items	Total reportable progress	Cumulative to June 30, 1970	
Conservation plans and	d Related co	rvicos	Cropland before GP			
District cooperatorsNo.	92,498	2,216,655	contractacres	824,644	10,466,248	
" acres	35,131,574	753,628,405	Planned cropland	139,592	2 107 045	
Cooperators canceledNo.	62,968	_	conversionsacres	139,392	2,107,945	
ecipients of technical —			Servicing other USDA programs			
assistanceNo.	1,158,708	-	Referrals serviced:	•		
Technical servicesNo.	3,108,942	_	ACP—F. Y. 1970No.	281,074	202.265	
Recipients applying practicesNo.	691,228		"—P. Y. 1969No. Cropland Adjustment		282,365	
Special mapping for	0,7,220		ProgramNo.	39		
planning and CNIacres	3,374,896	231,576,971	Cropland Conversion	4.6		
Conservation plans preparedNo. " "acres	75,397 28,661,801	1,744,639 575,180,612	Program No.	16 1,368		
Conservation plans canceledNo.	47,502		Appalachian ProgramNo. Conservation plans	1,500	_	
" " acres	15,399,438	_	approvedNo.	1,706		
Conservation plans revisedNo. "acres	36,328 22,008,975	_	G 11			
Inventories and evaluations	22,000,775	_	Soil surveys			
preparedNo.	33,982	_	Detailed soil surveysacres Reconnaissanceacres	41,213,428 1,985,693	785,651,857 25,671,600	
Federal lands in coordinated conservation plansNo.	121	962	(Total surveys)acres	(43,199,121)	(811,323,457)	
" acres	1,443,671	11,194,767	Soil conservation surveysacres	_	25,942,162	
State and county		,,	Soil conservation surveys canceled or convertedacres	1,377,436		
CNI reportsNo.	173	_	canceled of convertedacres	1,577,450		
Resource planning and implementation			Snow surveys and water-supply forecasting			
Services on resource plansNo.	61,272	_	Snow course measurementsNo.	6,335	_	
Units of government assistedNo.	19,824	_	Aerial snow marker readingsNo.	1,148		
Resource plans preparedNo.	929	_	Mountain precipitation	1,140	_	
Inventories and evaluations	C #11		gage readingsNo.	1,885		
for resource plansNo. Land use regulations	6,511	_	Soil moisture station	1,385		
establishedNo.	303	_	River stations for which	1,303		
Site selection for public	1 550		numerical forecasts issuedNo.	408	_	
facilityNo.	1,559		Numerical forecasts issuedNo.	1,941		
Operating units			Recreation developments			
Total operating unitsNo.	9,231 1,865,433	4,540,969	Land owners and operators	010 [21101102		
Miscellaneous land usersNo.	627,624	1,382,778,746 3,843,968	who have:			
Resource planning unitsNo.	4,142	79,049	Established their first commercial recreation enterpriseNo.	1,720	53,713	
Group plans, services, and installation plans			Expanded or added to commer-	1,720	33,713	
Group plans preparedNo.	2,158	8,625	cial recreation enterprisesNo.	855		
" " acres	2,004,245	10,868,787	Changed to recreation enter- prises as their primary			
Group inventories and	4,724	54,132	source of incomeNo.	257	10,359	
evaluationsNo. " acres	7,893,425	46,813,746		84,912	1,883,019	
Group plans installedNo.	4,053	51,067	Private noncommercial recreation facilities established			
Groups assistedNo.	1,962,524 12,187	28,817,613	or expandedNo.	29,933	505,255	
Services to groupsNo.	78,115	_	Public recreation facilities			
Groups applying practicesNo.	3,944		established or expandedNo.	611	33,118	
Great Plains Conservation Program			Watershed and RC&D Project measures			
GP applications receivedNo.	3,973	43,861	Floodwater structure site			
" "acres GP contracts signedNo.	7,068,987	82,818,187	investigatedNo.	493		
" " "acres	3,038 5,302,970	37,703 67,528,916	Channel site investigatedmiles Flood structure surveyedNo.	574 378		
GP contracts terminated:			Channel surveyedmiles	758	_	
By mutual consentNo.	143 136,947	1,095				
For causeNo.	130,947	1,542,591 823	Flood, structure designedNo. Channel structure designedmiles	459 550	_	
" " acres	42,341	700,175	Services on land rightsNo.	21,810	_	
By expirationNo.	3,192 5,943,699	17,345 28,656,557	Flood structure under			
(Total terminations)No.	(3,390)	(19,263)	constructionNo.	511	_	
" " acres	(6,122,987)	(30,899,323)	constructionmiles	900	_	

Summary of Progress, Fiscal Year 1970

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Practices	Total reportable progress	On the land June 30, 1970	Practices	Total reportable progress	On the land June 30, 1970
Beddingacres	21,915	613,064	Pipelinemiles	2,526	26,790
Brush controlacres	4,331,603	44,626,800	Pond No.	47,118	1.748.629
Chiseling and subsoilingacres	908,544	6,740,236	Proper grazing useacres	70,721,437	243,863,995
Clearing and snaggingmiles	768	5,588	Pumping plant for water	70,721,737	243,003,773
Conservation cropping	700	5,500	controlNo.	1,850	55,819
systemacres	22,278,148	189,556,057	Range seedingacres	507,099	14,100,233
	3,388,844	47,043,816		307,033	14,100,233
Contour farmingacres			Range rotation—	2715 (22	10 407 043
Controlled burningacres	362,108	6,846,542	deferred grazingacres	3,715,632	18,487,042
Critical area plantingacres	124,655	4,924,969	Recreation area	2.240	100.022
Crop residue managementacres	20,747,854	157,430,286	stabilizationacres	2,348	109,023
Dam, diversionNo.	609	25,726	Recreation area	45.601	601 101
Dam, multiple-purposeNo. acre-feet	318	5,733	improvementacres	45,621	601,104
	187,388	9,155,868	Recreation land grading		
Debris basinNo.	1,523	83,092	and shapingacres	15,551	211,005
Deferred grazingacres	12,859,236	65,304,265	Recreation trail and		
Dikemiles	303	10,730	walkwaymiles	598	6,276
Diversionmiles	2,326	98,274	Road, accessmiles	2,019	14,470
Drainmiles	25,965	776,278	Spring developmentNo.	4,148	116,998
Drainage field ditchmiles	5,520	172,220	Stock trailmiles	195	3,901
Irrigation canal or lateralmiles	254	45,529	Streambank protectionmiles	306	7,322
Irrigation ditch and			Stream, improvement		
canal liningmiles	1,261	26,480	for fishmiles	11	93
Irrigation pit or regulating	-,	,	Stream, channel		
reservoirmiles	1,145	47,541	stabilizationmiles	24	719
Farmstead and feedlot	1,115	17,571	Stream, open channelmiles	1.098	15,238
	42,580	774,756		511,072	21.260.399
windbreakacres	1,336	45,111	Striperoppingacres	73,566	
Field bordermiles			Structure for water controlNo.		2,032,142
Irrigation field ditchmiles	1,750	127,124	Terrace, basinmiles	100	1,829
Field windbreakmiles	3,559	87,450	Terrace, gradientmiles	12,426	757,815
Fishpond managementNo.	61,093	545,088	Terrace, levelmiles	11,002	384,225
Floodwater diversionfeet	94,258	1,324,278	Terrace, parallelmiles	7,097	69,610
Floodwater retarding			(Total terraces)miles	(30,625)	(1,213,479)
structureNo	412	10,092	Toxic salt reductionacres	55,284	1,453,599
" " acre-feet	228,784	5,263,592	Tree plantingacres	341,539	18,709,529
Floodwaymiles	35	713	Trough or tankNo.	12,674	440,520
Grade stabilization			Waterspreadingacres	39,362	974,568
structureNo.	12,915	210,634	WellNo.	7,278	492,933
Grassed waterway or outletacres	79,040	1,839,025	Wildlife wetland		
Grazing land mechanical			managementacres	377,903	3,561,431
treatmentacres	53,169	1,390,860	Wildlife habitat		
Hedgerow plantingmiles	321	25,010	managementacres	5,047,066	21,403,492
Hillside ditchmiles	145	2,341	Wildlife watering facilityNo.	1,030	53,681
Irrigation pipelinemiles	4,355	69,600	Woodland direct seedingacres	11,921	568,493
Irrigation storage	.,,,,,	02,000	Woodland improved	,	
recervoir No	450	40,214	harvestingacres	1,383,210	28,426,671
reservoir "No. "acre-feet	16,801	7.760.212	Woodland improvementacres	473,135	14,308,165
Tunication system aminhla Na		. ,	Woodland site	773,133	14,500,105
Irrigation system, sprinkler No.	4,553	120,649	preparationacres	133,091	3,546,040
Irrigation system, surface			preparationacres	155,071	3,340,040
and subsurfaceNo.	5,801	139,840			
Irrigation system, tailwater			Land tre	ated	
recoveryNo.	1,042	12,303	Land adequately treatedacres	43 722 444	587,650,511
Irrigation water			Land adequately treatedacres	73,722,777	507,050,511
managementacres	4,080,008	18,703,546			
Land grading for drainageacres	36,204	385,132	Land use con	versions 1	
Land leveling for irrigationacres	382,307	10,929,988	Cropland to grasslandacres	1,099,762	22,463,522
Land smoothingacres	305,084	6,938,316	Cropland to woodlandacres	60,024	2,585,293
Main or lateral drainagemiles	5,950	350,645	Cropland to wildlife—	00,02	2,000,200
Minimum tillageacres	2,032,106	18,582,842	recreationacres	78,235	1,214,460
Mulchingacres	39,421	728,000	Cropland to "other"acres	81,875	4,640,104
Pasture and hayland	37,421	720,000		197,956	6,683,785
	10 088 622	54 306 771	All other uses to croplandacres	157,550	0,000,700
managementacres	10,988,622	54,396,771	All other uses (except crop-		
Pasture and hayland	2.070.000	64 50 4 156	land) to wildlife—	100 (25	6 020 202
plantingacres	3,079,668	64,594,156	recreationacres	490,635	6,820,293

 $^{^{\}rm 1}$ Conversions on the land June 30, 1970, are estimates of conversions since July 1, 1962.

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"fish farming" have resulted in the opening of new fish-processing plants, particularly in the Southeast. These provide new rural job opportunities as well as an outlet for farm products.

Plant materials

Two new varieties of woody plants with promise for conservation uses were released by SCS after evaluation in Plant Materials Centers and in the field.

"Arnot" bristly locust, for critical area stabilization and beautification, and "Rem-Red" amur honeysuckle, were released for broad use in the Northeast.

"Lutana" cicer milkvetch, a forage legume, was released in the West.

A vigorous new variety of American beachgrass "Cape," is showing promise for conservation service in the mid-Atlantic area. It is nearly ready for release to commercial growers.

Studies continue to seek and adapt plants for special conservation uses at the 20 SCS Plant Materials Centers and on farm and other land owned by conservation district cooperators.

Around the world

Thirty-nine SCS employees were on long-term assignment in seven countries in 1970. They were assisting in development of conservation programs and helping people acquire new skills in the use and protection of natural resources.

Four SCS specialists completed short-term assignments in four countries giving consulting assistance.

Some 369 individuals traveled to the United States during the fiscal year to learn conservation skills. They spent about 5,000 man-days with SCS conservationists in various states.

Conservation Needs Inventory

Final figures in the Conservation Needs Inventory, the detailed study of nonfederal land (about 65 percent of the Nation), became available for use. The inventory showed that rural land in land-capability classes I, II, and III, suitable for regular cultivation, totals 630,771,000 acres. Land in class IV, suitable for limited cultivation, totals

180,441,000 acres. The national summary now being prepared for publication contains useful, basic information for hundreds of groups and organizations. ◆

Conservation in action . . .

Water users waste less, enjoy more

Idaho

In Owyhee County, Idaho, resource development is an idea that caught on quickly. It gained momentum as it went along.

One of the obvious problems faced by area farmers — as the Owyhee Soil Conservation District supervisors had pointed out—concerned water. Too much irrigation water, a principal resource, was being lost.

At the suggestion of the district board, a county planning committee looked into the possibility of saving water through improvement of irrigation systems.

When irrigation company directors talked over the possibilities

Concrete lining of irrigation ditches—one direct result of resource development planning in the Owyhee District.



with resource development specialists, interest spread. Reorganization of systems, it appeared, could pay attractive dividends in water saved.

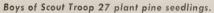
The Soil Conservation Service delved into opportunities for water conservation, erosion prevention, and the economic aspects of system overhaul. The Owyhee extension agent, Jesse Wilson, reported on weed control, solution of drainage problems, and improved water management. Gaylord Harward of the Farmers Home Administration and Gene Showalter of the Agricultural Stabilization and Conservation Service explained how loans and cost-sharing could aid the work.

The activity resulted in reorganizing three large irrigation systems, with full consideration for improving the environment. Seventeen miles of concrete-lined canal and nearly 100 new irrigation structures have been installed to conserve and accurately measure water apportioned to farms.

The farmers in turn have entered enthusiastically into the effort by improving onfarm systems and cropping practices. Pasture seedings have taken a sharp jump as landowners use improved grasses to take advantage of the potential offered by better water management.

Alvin Benson, a supervisor of the Owyhee District and president of the West Reynolds Irrigation District, believes the improvements are a direct payoff from the resource planning process.







Apples and opportunity ripen in the Pri-Ru-Ta RC&D Project.

"When we studied our potential from all angles, we could see where to concentrate our efforts to do the most good with the resources we had," Benson said. — JOHN K. NOYES, district conservationist, SCS, Marsing, Idaho.

Missouri

SCS helps with plan for rural retreat

When James Parker of Kansas City bought 27 acres in Johnson County, Mo., a few months ago, he and Mrs. Parker had in mind a pleasant spot for rural recreation. They also looked upon the site as a weekend outing spot for their son's Scout troop.

The tract borders U.S. Highway 50 northwest of Warrensburg. Parker asked the Johnson County Soil and Water Conservation District board for help in developing a conservation plan. The Soil Conservation Service team at Warrensburg provided the help needed.

A first step was a 3-acre lake. SCS conservationists designed and staked the dam. Parker got a private contractor to build it.

The SCS Plant Materials Center at Elsberry, Mo., provided test plantings—Emerald crownvetch for bank stabilization and Amur honey-suckle and autumn-olive for screening and wildlife cover. Parker

bought Scotch pine and eastern redcedar from the Missouri Department of Conservation for windbreak planting. The department also furnished a beautification bundle a variety of shrubs and trees through a cooperative agreement with the district.

The Parkers' son, Walter, and other members of Scout Troop 27 spent several weekends this spring planting the shrubs and trees. Parker is elated at the outcome of this opportunity to "give the boys a chance to communicate with nature and at the same time put the soil and water conservation plan into action."—George R. Hayes, district conservationist, SCS, Warrensburg, Mo.

Wisconsin

Soil maps guide apple land buyers

In the Bayfield area of northwestern Wisconsin, the production of fine apples and other fruits is an industry with room to grow.

Present growers, realizing that a greater output would contribute to their own success, are inviting others to join in while the right land for fruit growing is available.

As an activity in the Pri-Ru-Ta Resource Conservation and Development Project, owners and prospective purchasers are making good use of interpretive soil maps in considering sites for new orchards.

An attractive brochure they are distributing tells of the area's potential, describes the soil character, and its limitations for orchard use.

When interest developed in expanded fruit-growing in the area as an RC&D activity, the Soil Conservation Service assisted with soil surveys. Special attention was given to identifying the soils best suited for apple and small fruit production. University of Wisconsin extension specialists helped with the guidelines needed.

The information, in language that can be readily understood by those not already schooled in fruit growing, went into the brochure, along with information on management in successful production.

The publication was financed partly by local people through the Bayfield County Soil and Water Conservation District and by state funds appropriated by the State Legislature for such projects.

Response to the invitation to join in fruit growing in the Bayfield District has been favorable. An increasing number of requests are coming in for detailed information and onsite investigations from fruit producers.—Steve W. Payne, soil scientist, SCS, Ashland, Wis.

Farm pond tapped for fire protection

Ask any fireman what he dreads most and he probably will tell you it is a call to fight a rural fire. Too often, water is unavailable or inaccessible. There is little a fireman can do but watch the place burn.

A program to give the firefighter better odds in control of rural fires is being developed in Mercer County, Pa. Selected farm ponds with special hydrants are its backbone.

Pauline Marsh, housewife and secretary to the County Association of Township Supervisors, is one of the supporters of the project. She has seen too many fires destroy homes and barns because of an inadequate supply of water. The problem is growing as the countryside fills with new homes, shopping centers, and recreation areas.

"I can't recall who came up with the idea of using ponds in a county-wide fire protection system," Pauline said. "But it's a good one and is included as one of the objectives of the Penn-Soil RC&D Project. We have a number of ponds that hold a lot of clean water. It wasn't difficult to convince the township supervisors or the fire companies of the merit of the project or to work together in setting it up."

The first step was to ask District Conservationist Dick Crowley of the Soil Conservation Service for the location of the ponds in the county. Ponds near roads and located to give good coverage were identified. The homemade hydrant that Crowley had designed was accepted as the standard.

The townships agreed to obtain needed rights-of-way to the ponds, buy the hydrants, and pay for installation, about \$200 a pond. SCS provides the needed technical help in installing the hydrants, which are tested by the local fire companies. The companies also run an annual check to assure that the hydrants are working satisfactorily.

Several townships already have installed a number of hydrants. Four other townships appropriated funds for installing hydrants. They give the firefighter better odds and the property owner more peace of mind — and at bargain prices. — RICHARD H. CROWLEY, district conservationist, SCS, Mercer, Pa.

Missouri

SCS helps with lake, recreation planning

When the Washington, Mo., park commission expanded its park area with the buying of a 94-acre farm, an immediate project was the building of a lake. The Soil Conservation Service staff working through the Franklin County Soil and Water Conservation District was asked for technical help.

A survey by SCS led to the design and construction of a dam for a 13-acre lake, for which the local Lions Club contributed \$8,000. The lake, with shelter houses, picnic tables, and barbecue pits nearby, has become a popular recreation center. Fishing for the bass, bluegill, and channel catfish has been heavy, and in winter the lake has provided skating. Parts of the area have been developed for fairgrounds, show arena, tennis courts, and ball diamonds.

A grant for further recreational development has been approved by the Bureau of Outdoor Recreation, with local civic groups donating matching funds. SCS technical personnel helped with the plan for the new improvements.—WILLIAM C. SHOTWELL, district conservationist, SCS, Washington, Mo.

Texas

Land scars healed, sediment halted

The Nueces River, looping across south Texas from west to east, is the water transport channel for a cluster of cities and industrial plants in Texas' coastal area.

To Mrs. Charles Thiele and Robert Stripling, owners of ranch-

land along the river near Sinton north of Corpus Christi, the river posed a special problem. Both had critical areas which were yielding sediment to the stream at an unusually rapid rate.

At about the same time both owners, as cooperators with the San Patricia Soil and Water Conservation District, asked the Soil Conservation Service for help in halting the erosion which was costing them valuable land and contributing heavy loads of sediment to the river.

Mrs. Thiele and Stripling, using SCS technical guidance, developed complete conservation farm plans. Each plan called for removing brush from the eroding areas and the shaping of gully banks. The soil in the shaping process was pushed away from the channel as much as possible to maintain the original channel condition.

The shaping completed, the areas were rootplowed to an 18-inch depth to promote moisture penetration. The surface was then smoothed. After rains had replenished moisture in the soil, the areas were sprigged with Coastal bermudagrass.

Fertilization, weed control, and conservation management have produced the desired protection. The erosion is under control. Sediment no longer flows into the Nueces from the areas. Cattle now graze the gentle slopes, a profitable income source.

In addition, as Mrs. Thiele readily points out, the countryside has acquired a far more pleasing prospect.

"Some of the people here were skeptical about controlling erosion by any means in this watershed," she recalled. "We have solved the problem, and, with good maintenance and management, we should have no further trouble."

Conservationists who have seen the change are quick to agree.—Martin E. Vavra, engineering field specialist, SCS, Austin, Tex., and G. P. Johnson, civil engineer, SCS, Alice, Tex.

Meetings . . .

NWGA looks to young people

After several "down years," the sheep industry is looking at its powerful potential for the future. The outlook and other interesting topics will be discussed at the 106th annual convention of the National Wool Growers Association in Las Vegas, Nev., January 18-21, 1971.

A repeat of a successful panel discussion at last year's meeting will feature young people in the sheep industry and the way they see the future.

Two industrywide groups will meet immediately before the convention opens: The Industrywide Lamb Planning Committee and the Industrywide Wool Planning Committee.

A special post-convention tour to Mexico is planned.

ANCA convention expands its horizons

The American National Cattlemen's Association has felt the need for some time to present a broader scope of the cattle industry at its annual conventions. Its theme at the Association's 74th annual convention January 24-28, in Las Vegas, Nev., is "Expanding Horizons." A trade show and special programs are included.

"What Consumers Think of You," "Expanding Horizons in Beef Production," and "Money-Management Revolution in the Beef Cattle Industry" are a sample of the new format.

Cooperatives and rural America in the 1970's

The National Council of Farmer Cooperatives meets January 9-13 in Washington, D.C.

Discussion topics include "Farmer Cooperatives' Image on Capitol Hill;" "Inside Washington;" "The

Shape of Rural America in the 70's;" "The Crisis in Transportation;" "Issues of the 70's" (a fourman Congressional panel); and "Success Goes to Those Who Communicate."

Workshops for land improvement contractors

The Farm and Industrial Equipment Institute, the Land Improvement Contractors of America, and SCS will sponsor four 2-day workshops for land-improvement contractors:

January 20-21, Jackson, Tenn. January 26-27, Manchester, N.H. February 1-2, Madison, Wis. February 4-5, Denver, Colo.

Subjects to be studied include trends for the contracting business in 1971; public and private work opportunities; soils and methods of testing; profit from earthmoving; control of erosion, pollution, and other problems in drainage and irrigation; keys to production and cost estimating; safety on the job; new sales approaches; bidding on government contracts; and elements of a finished job.

Dates and places

January 9-13, National Council of Farmer Cooperatives, Washington, D.C. 17-21, National Association of Home Builders, Houston, Tex. February

18-21, National Woolgrowers Association, Las Vegas, Nev.

24-28, American National Cattlemen's Association, Las Vegas, Nev.

7-11, National Association of Conservation Districts, Chicago, Ill.

15-18, American Society of Range Management, Reno, Nev.

20-24, American Association of School Administrators, Atlantic City, N.J.

21-24, American Road Builders Association, Los Angeles, Calif.

22-24, Sprinkler Trrigation Association Technical Conference, Denver, Colo. 24-26, Land Improvement Contractors of America, Indianapolis, Ind.

24-27, National Farmers Union, Washington, D.C.

26-28, Family Camping Federation, St. Louis, Mo. ♦



Our Soils and their Management. By Roy L. Donahue. 1970. 3d ed. Interstate Printers and Publishers, Danville, Ill. 683 pp., illus. \$10.75.

This is the third edition of this practical book on managing soils for efficient production. It is directed largely toward vocational agriculture students and teachers and to practicing farmers. The style is down to earth. It is easy to read and understand. The author supports his conclusions with a wide range of resource material and he lists a great variety of additional references for further reading.

Basically the book is a "how-to-do-it" treatise on managing soils for greater production, with enough soil science for the student who wants to know why. Each chapter is followed by a discussion of a demonstration or activity. This feature can be particularly useful to a teacher or to a discussion leader.

Sample chapter headings are: How to judge land; organic matter; lime and its use; fertilizers—what they are, how to use them; tillage problems; water conservation; soil conservation; irrigation; drainage; managing soils and water for field crops; managing soils and water for gardens and lawns; managing soils and water for pasture, for ranges, for orchards, and for forests.

The author has added a comprehensive new chapter on "Job Opportunities in Agricultural Technologies and Professions." In it he discusses the requirements for becoming a soil conservationist, soil scientist, and the possibilities for employment in these and other agriculture-related activities. — A. B. Foster, formerly chief, Education and Publications Branch, Information Division, SCS, Washington, D.C.

River of Life. 1970. U.S. Department of the Interior. Conservation Yearbook 6. 96 pp., illus. \$2.00.

The Department of the Interior makes *Water: the Environmental Challenge* the theme of its sixth annual report prepared in the form of a colorful "conservation yearbook."

Like the USDA Yearbook of Agriculture of much longer standing Interior's new yearbook series each year considers in depth a timely subject. To a greater degree, however, it retains the role of annual report by giving specific accounts of activities of the several agencies of the department. Necessarily, the result is a compromise between the two objectives; this year, for example, only the water- and environment-related activities of the agencies are reported.

As a subject-matter treatment, this yearbook is perhaps the best of the series. It is informative, well written, and handsomely illustrated. The introductory treatment of the hydrologic cycle and world water supply is an unusually concise and lucid summary of this vast and complex subject.

In discussing *Water: the Environ-mental Challenge*, the yearbook editorially concludes, "Of all our resources, we have mismanaged water the most." The report tells what each USDI agency has done recently to counter this unfortunate condition.—B.O.O.

Weather Economics. Edited by James A. Taylor. 1970. Pergamon Press, Oxford and New York. 140 pp., illus. \$8.00.

This volume contains the eight papers and discussion presented at the 11th annual Aberystwyth (Wales) symposium on agricultural meteorology. It provides a lively account of how a number of weather-related problems in agriculture and forestry are being dealt with in the United Kingdom.

Annual benefits of 30 million dollars accrue to British agriculture from use of presently available weather information, at a cost-benefit ratio of 20 to 1. Benefits are greater for higher levels of management.

The symposium emphasized that weather protection and avoidance should be costed realistically in relation to benefits. This is a good point to make. On the other hand, the symposium, in relating economics primarily to the weather forecast rather than to climate, added a major uncertainty; namely, the accuracy of the unspecialized forecast for a specific, applied use. This means that much of what appears in the book is very interesting discussion but is not guidance. Perhaps if the symposium had had the reverse emphasis namely, on climate—the book would have been much duller but of more value to conservationists in the use of climatology.—Franklin New-HALL, climatologist, SCS, Hyattsville, Md.

New publications

Hydrologic Data for Experimental Agricultural Watersheds in the United States, 1963. Compiled by Harold W. HOBBS AND JAMES B. BURFORD. 1970. USDA Misc. Publ. 1164. 465 pp., illus. \$4. Presents annual basic data on monthly precipitation and runoff; longterm mean monthly precipitation; annual maximum discharges and volumes of runoff; and daily air temperature, precipitation, and discharge. Selected runoff events with associated data are included on rainfall, land use, and antecedent conditions for agricultural watersheds in Arizona, Florida, Georgia, Idaho, Illinois, Iowa, Mississippi, Missouri, Nebraska, New Mexico, New York, Ohio, Oklahoma, South Dakota, Texas, Vermont, Virginia, West Virginia, and Wisconsin.

Eleven Authorized Flood Prevention Watersheds. Rev. 1970. USDA: Soil Conservation Service SCS CI-15 13 pp., illus. Describes progress in 11 large watersheds selected in the 1940's for planning and installing measures to reduce water runoff, control erosion, and slow down streamflow. The work, carried out under the responsibility of the Soil Conservation Service and the Forest Service, paved the way for the watershed program under Public Law 566.

A Practical Guide to Water Quality Studies of Streams. By F. W. KITTRELL. 1969. U.S. Dept. Interior, Federal Water Pollution Control Administration CWR-5. 135 pp., illus. \$0.70. Devotes each chapter to a single factor, principle, or procedure involved in studies of water quality, such as objectives of stream studies, physical characteristics, etc., and suggestions for preparation of a report on water quality.

Private Assistance in Outdoor Recreation. 1970. U.S. Dept. Interior, Bureau of Outdoor Recreation. 82 pp. \$0.45. A directory of organizations providing aid to individuals and public groups.

National Parks of the United States, Northeast, Southeast, Midwest, Southwest, West, Washington, D.C., New York City. 1968. U.S. Dept. of Interior, National Park Service. \$1.50. A packet containing eight folders on the national parks.

Soil-Temperature Regimes — Their Characteristics and Predictability. By Guy D. Smith, Franklin Newhall, Luther H. Robinson, and Dwight Swanson. 1964, reprinted 1970. USDA Soil Conservation Service SCS-TP-1964. 14 pp., illus.

1970 Handbook of Agricultural Charts. 1970. USDA Agr. Hbk 397. 145 pp., illus. \$0.65. Charts depict the domestic situation, foreign production and trade, population and rural development, and commodity trends.

Sharing Our Land With Wildlife. 1970. USDA Soil Conservation Service. [16 pp.], illus. Narrative guide for color slide set and film strip C-177.

Your United States Department of Agriculture. 1970. USDA PA-824. 14 pp. Summarizes the work of the Department.

Soil surveys

Berks County, Pennsylvania. BY FRANKLIN S. ACKERMAN. 1970. 125 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by Franklin S. Ackerman, J. B. Carey, Milton French, William D. Hannigan, Herbert Hopper, William H. Houck, Raymond Mattern, Earl Reber, Edward Ropel, and David Taylor.

Sequoyah County, Oklahoma. By EDWARD J. ABERNATHY. 1970. 57 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Ozaukee County, Wisconsin. By DALE E. PARKER, DONALD C. KURER, AND JOSEPH A. STEINGRAEBER. 1970. 92 pp., illus.; maps 4 inches to the mile (1:15,840).

Recon...

A job for all

"Our farmers and conservationists with the help of the USDA and other government agencies . . . have managed to create through the stewardship of soil, water, and forest resources the most abundant food supply the world has ever seen—plus safer drinking water for a higher percentage of our people than ever before—plus facilities for recreation unmatched in history—plus vastly increased opportunities for fishing and hunting . . .

"Our farmers, ranchers, and foresters as a whole have done more than any other part of our society to improve the natural environment.

"There is a vast amount of conservation work remaining to be done—work that will demand many people, many talents, and many dollars . . .

"We must continue to strive for a maximum of harmonious action among the several Federal agencies and departments (and) better Federal-State working relationships show citizens how they can help . . . carry the message far and wide that conservation is everybody's problem . . . that all of America has a stake in the proper use of soil whether it is privately or publicly owned-in fish, game, and other wildlife on private as well as public preserves-in parks, playgrounds, and other recreational areas in private or public hands—in natural beauty in our cities, along rural roads, beside a creek or mighty river-in having clean water, adequate water, but not floods . . .

"Just as all of America has a stake in natural resource conservation, so also all of America has a very big stake in human conservation.

"What we must finally learn is that all of our environments—natural, economic, social, educational, and cultural—are interconnected. They tend to merge and affect one another. And we can overlook this fact only at our peril as a civilized society."—UNDER SECRETARY OF AGRICULTURE, J. PHIL CAMPBELL, Waterloo, Iowa, September 14, 1970.

South Africa's updated Soil Conservation Act in effect since last December has similar aims to those so often stated by conservation districts and SCS; but the implied means differ a little. In reference to apparent apathy among farmers in a key watershed, the National Veld Trust's monthly magazine said recently, "To persuade the rest by means of propaganda and educational campaigns to take action will be too slow a process, even if there are enough extension officers. The new Soil Conservation Act does, however, make provision for compulsion and the prosecution of laggards."

Shaping our land

"Now is the time, while we still have some elbow room, to take a hard critical look at our land and how we want to use it . . .

"How land can be put to best use for the greatest number of people is a matter that could be . . . a key to America's future. It involves such vital issues as: adequate supplies of pure water, continuing abundance of farm products, living and working space for a growing population, protection of species and ecological systems, development of increased transportation facilities . . industrial and power plants, and the creation of safer, pleasanter environments for recreation and cultural purposes . . .

"The area of America's usable land is fixed, by and large. How land is to be apportioned . . . will have to be governed, sooner or later, by sensible, carefully thought out guidelines . . . The Department of Agriculture and numerous other agencies of government at Federal, State, and local levels will have important contributions to make.

"Since most of the land involved is privately owned, many of the decisions for formulating and carrying out national land use policy will be made by landowners . . .

"The Department of Agriculture has long had a leading role in the national land policy area, a tradition reflected in the Department's many rural development programs—experience in conservation, in the use of credit, and in planning.

"The millions of acres of National Forests and Grasslands are important assets. So, likewise, are the cooperative programs that are under way with State departments of agriculture, experiment stations, land grant educational institutions and other uni-

versities, and the State extension services. There are the ASC county committees and more than 3,000 local conservation districts; and hundreds of thousands of farmers cooperating under voluntary agreements.

"An outstanding example of USDA's capabilities may be found in some of the magnificent work of the Soil Conservation Service, which has been concerned with environmental improvement for 40 years.

"All together, these represent experience, "know how," leadership, facts, and organization—all necessary ingredients in further developing and carrying out a coordinated and innovative program of land use."—Secretary of Agriculture, Clifford M. Hardin.

If it's fit to print, keep it out of the garbage is the word in more and more communities as they work to recycle newsprint. Several firms across the Nation are doing a brisk business in repulping old newspapers since a workable de-inking process came on the market in the early 1960's. What's in it for the community? An article in the August 1 issue of Editor & Publisher magazine said that newsprint may represent as much as 40 percent of a homeowner's garbage yield. Recycling it lowers air pollution, refuse disposal costs, and newsprices; and every ton of newsprint salvaged saves 17 trees.

"Green Survival Depends On You," is the theme of an advertising campaign sponsored by the American Association of Nurserymen, Inc. More than 350 merchandising kits containing mobiles, bumper stickers, posters, buttons, and plant tags have been sold to members for use in their own communities. Sample radio announcements and press releases have been used. The campaign has proved to be a popular way to sell plants, landscaping advice, and a constructive attitude toward home-based conservation efforts. A popular item is the 12-page booklet, Green Survival and the Environmental Crisis. Single copies are available at no charge from AAN, 835 Southern Building, Washington, D.C. 20005.

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Buffelgrass finds Puerto Rican home

A strain of buffelgrass native to the low rainfall region of South Africa appears to have won a respected place among conservation plants on the semiarid southwest part of Puerto Rico.

In a decade it has proved to be one of the important new forage grasses on the island.

Burning, overuse, land clearing, and periods of drought over the years had altered the grass communities on the island's semiarid sites. Less useful grasses took over. The need became urgent for a grass that would thrive and efficiently produce under natural conditions.

Buffelgrass T-4464 was introduced to the island by the Soil Conservation Service in 1959 in the SCS program of assembly and evaluation of plants. It is a perennial bunchgrass that attains a height of 6 inches to 4 feet, depending on soil and moisture conditions. Culms develop from buds emerging from a tough knotty crown. The root system extends to an unusual depth. The plant produces abundant, mediumfine leaves of intense green. Seed is abundantly produced all year but especially in late fall.

Success of plantings to date indicate that buffelgrass T-4464 is well adapted for pasture and hay uses under the adverse climate conditions prevailing in the Caribe, Sur, and Suroeste soil conservation districts in Puerto Rico. Plantings have been established on more than 3,500 acres of Coamo, Descalabrado, Santa Isabel, Fraternidad, Jácanas, Amelia, Sosa, and Americus soil series.

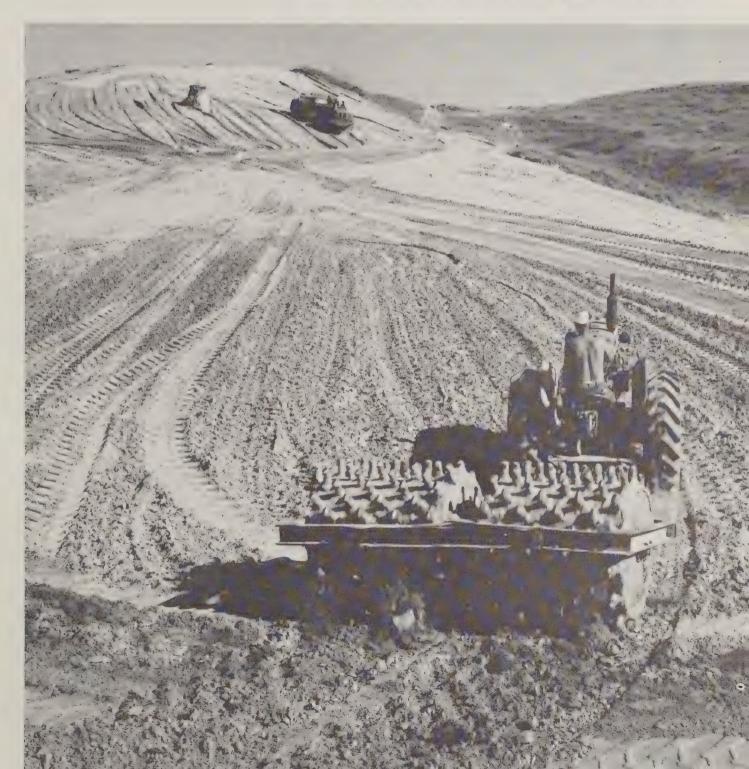
Experiments have shown that buffelgrass produces exceptionally heavy amounts of roots an acre to make the soil more fertile and less susceptible to erosion. To this can be added the role of organic matter in improving the soil's water-holding capacity.

Forage value of buffelgrass is high. Recovery from grazing is excellent. When adequately fertilized and irrigated, harvest intervals can be reduced to every 45 days. Hay is of excellent quality and of high nutritive value when compared to imported hay.—Aurelio Sierra-Bracero and Emerito Martinez-Ruiz, plant materials specialist, SCS, Mayagúez, and information officer SCS, San Juan, Puerto Rico.

Buffelgrass makes lush growth on a farm in the Suroeste District.



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February 1971, Vol. 36, No. 7

The shape of things

An important part of soil and water conservation work involves reshaping bits of the earth's surface to control the flow of water.

Without the earthmoving industry—the manufacturers and distributors of equipment and the contractors who use it—modern conservation would be impossible.

Without the expertise of engineers and conservationists who help design both equipment and earthen structures, and plan where to use them, our efforts would be misdirected and ineffective.

Examples of conservation earthmoving in this issue show something of the ingenuity being used and the variety of problems being met.

Professionals and contractors pitched in together to install on-the-job sediment controls during construction of a highway interchange near Pittsburgh (p. 147).

In Utah and Wisconsin (pp. 156, 157), engineers met the challenges of problem sites in building dams to control floods and store water for beneficial uses.

Irrigation farmers in the Rio Grande Valley (p. 149) shape the entire surface of fields to gain positive control of irrigation water.

These examples are matched by countless others across the country as this important work goes forward.

COVER: Earth dam being built under Great Plains Conservation Program, Chase County, Nebr., will protect a feed yard, county road, and bridge from flooding.

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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Highway builders keep sediment on site during construction

By John Robb

Assistant state conservation engineer, SCS, Harrisburg, Pa.

S temming the flow of mud from a major highway construction site during the bad weather of a mid-Appalachian winter is a problem to make engineers, contractors, and conservationists wonder if there aren't easier ways to make a living.

But when the people concerned with a project join their efforts in a common purpose they can greatly reduce erosion and sediment even as work progresses under the most difficult circumstances.

They did it on the 70-acre Campbells Run highway interchange near Pittsburgh, Pa. If it could be done there, it can be done elsewhere.

The project plan called for moving 6 million cubic yards of earth. Work started in the fall of 1969. When bad weather slowed construc-

tion, it was obvious that it did not slow erosion. Flood-control structures downstream and the growing public concern for the environment made it imperative that sedimentation be held to a minimum.

A meeting was arranged between the contractor, Glasgow Inc., of Glenside, Pa.; the resident engineer of the Pennsylvania Department of Highways, Jim Donovan; a representative of the Pennsylvania Department of Forests and Waters, Vernon T. Houghton, Jr.; and other concerned agencies, including the Soil Conservation Service. Together, they worked out methods of reducing erosion while work proceeded as well as while work was stopped by bad weather.

The deep, narrow valley of Camp-

Contractor, engineers, and conservation officials gave sediment control top priority in Campbells Run interchange.



Trees cleared from site helped check runoff.



bells Run makes installing of sediment-control measures unusually difficult. There is no room for conventional debris basins on the main stream, and the side tributaries are too steep for their use there. Since it was winter, seeding of temporary vegetation was impractical.

A series of horizontal benches and diversions, which would double for haul roads, were installed. They were laid out in broken patterns so no direct runoff would enter Campbells Run. The runoff water from the site was passed through a series of desilting basins.

An abandoned bridge near the lower end of the construction area was used to anchor a dumped-rock dam to trap and hold sediment. The basin will be cleaned when storage capacity is filled.

Burning of timber is not permitted in the Pittsburgh airshed area. To dispose of trees cleared from the site without causing air pollution, the contractor used the trunks to construct barriers upstream from the rock dam, thereby slowing the flow of runoff.

The limbs and brush were used to make additional barriers, which

proved effective in removing sediment from the runoff of small storms.

Diversions which protect slopes from erosion also protect work areas where culverts are being formed and poured. They are relocated as necessary as the work progresses. Damage to control measures by unusually heavy storms is promptly repaired.

Campbells Run demonstrates that pollution and sedimentation can be controlled during construction even under difficult conditions. •

Soil and water conservation is big business

In numbers of machines, equipment hours, operator time, supplies, and quantities of earth moved, the magnitude of soil and water conservation action challenges the imagination.

Machines in any one year move 1 billion cubic yards of earth in installing the wide range of conservation practices required. This includes 258 million cubic yards for earth dams, 212 million for grassed waterways and channels, 82 million for terracing, and 352 million for land grading, leveling, and smoothing.

Other practices in conservation require additional amounts.

What does it take to move this

mountain of earth each year? A survey completed in 1968 showed that conservation contractors, individual landowners and operators, and soil conservation districts own 457,000 pieces of equipment used primarily to install and maintain conservation work.

About 143,000 pieces of equipment are of the heavy construction type: Bulldozers, track-type tractors, heavy wheel-type tractor draglines, backhoes, motor graders, and tiling machines.

Remaining categories include carryalls, special plows, terracing machines, tree planters, special drills, and landplanes.

Into the conservation effort each

year go 425,000 cubic yards of concrete, 3.9 million feet of corrugated metal pipe, 15 million feet of concrete pipe, 19 million feet of pipe of steel and other materials, 11 million feet of small-diameter water pipe, 12 million feet of tile, and 14 million feet of aluminum sprinkler pipe.

Getting vegetation on 4.3 million acres of pasture, critical erosion areas, and rangeland requires the spending of \$111 million for seed, fertilizer, and lime.

For the protection and proper mangement of range, landowners install 14,000 miles of fence.—R. C. BARNES, Engineering Division, SCS Washington, D.C. ◆

Irrigators shape their land for water control



By Billy Jack Garner
Area engineer, SCS, Harlingen, Tex.

A round Harlingen in the Lower Rio Grande Valley of Texas, landowners shape their land for irrigation for several quite logical reasons.

Mostly, it is for the better control of water.

This means lower cost of labor for irrigating. It also means holding losses of water to a minimum.

Leveling of fields makes possible the even distribution of irrigation water and rainfall, resulting in uniform crop growth.

Land leveling on a large scale

began in the Rio Grande Valley about 1950. In the 20 years since, nearly half of the Harlingen area's 780,000 acres of irrigated land has been graded to meet today's standards. The earth moved would build a dam 50 feet high and 100 miles long.

Most land-leveling jobs in the area require moving about 400 cubic yards of earth for each acre. Rougher land may raise this figure to 1,000 or even 1,500 cubic yards to the acre in some instances.

The average land-leveling job

costs \$75 an acre. Heavier jobs cost \$150 or more an acre. The investment, most landowners say, is recovered in 3 years.

The most commonly used equipment for land leveling in the Lower Rio Grande Valley is a large farm tractor with two 4- or 6-cubic-yard carryall scrapers pulled in tandem.

At all points in the field, the land surface is graded within 0.1 foot or less of the planned elevation. The final work is done by floats or landplanes 45 to 80 feet long. These assure a smooth surface by filling in



Uneven fields (left) result in ineffective water use, land damage, and poor crops. Properly leveled (above), the furrows spread the water uniformly.



After the scraper, a landplane eliminates minor irregularities in the surface.

or cutting off minor irregularities left by the scrapers.

If deep cuts are necessary, they are made to a few inches below the planned elevation, and the areas are backfilled with topsoil. This eliminates or shortens the time required to bring such an area up to normal crop production. No other special soil treatment ordinarily is necessary.

Land leveling must be designed in accordance with variations in soils, the crops to be grown, the water supply, and the method of irrigation in each case. As in other parts of the United States, standards for land leveling in the Lower Rio Grande Valley are set forth in the local Soil Conservation Service Irrigation Guide. The guide is based on proved irrigation principles and knowledge of the special conditions of the local area.

Much of the land leveling in the Lower Rio Grande Valley is for the level irrigation method, which requires a surface that is essentially level with a very slight grade to facilitate water spreading and removal. For the graded border or graded furrow method, the land has somewhat more slope on which water is applied under a different principle of irrigation.

No matter how good a land-leveling job may be, shaping the land in itself will not accomplish the full benefits of a conservation-irrigation system. The real payoff comes from good water management that applies the correct amount of water at the right time and the right place—i.e., in the root zone—and with uniform distribution over the field.

Irrigators in the Harlingen area have found that land leveling, plus good water management, has paid big dividends in conservation of irrigation water, retention of needed rainfall, lower costs, and more uniform and better crops. •

New Orleans is a city hemmed in by water, marshes, and the Mississippi River.

The land is boggy, below sea level, and good building sites are at a premium.

"Where are we going to put all the people in the next 20 years?" the planners ask.

The city, with its suburbs, has well over a million residents now. Like most such centers, it is growing rapidly. Another million residents are expected in the next two decades.

The fact is New Orleans has run out of land for its needed development—almost. There is an abundance of land, however, for other uses.

A soil survey recently completed by the Soil Conservation Service, with the city paying half the cost, holds some of the answers needed by the puzzled New Orleans officials.

The Regional Planning Commis-

sion for Jefferson, Orleans, and St. Bernard parishes arranged with SCS for the survey and asked Mike Aulick, a planner with the commission, to head the project. The SCS, cooperating with the Crescent Soil and Water Conservation District, entered into an agreement with the commission for the special survey.

The commission selected 50,000 acres expected to bear the principal burden of development in the next 20 years.

The findings in the survey were not surprising. The soil scientists found the answer to why many homes and streets cracked, and why lawns sank away from the foundations. Organic soils occupy much of the area surveyed. They are different from mineral soil which is made up of sand, silt, and clay. Organic soil (peat and muck) is mostly grass that has partly rotted. When organic soil is drained, the surface subsides and oxygen gets to

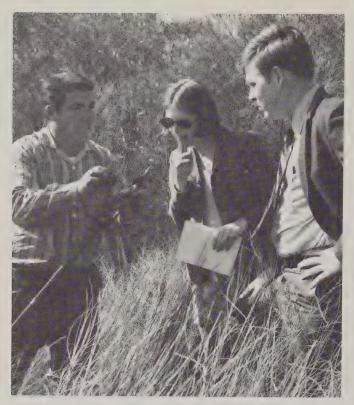
Where to build? New Orleans gets the answers

No rustic decoration, the boards at right, but a needed addition after the driveway sank below the carport. A 3-year-old levee (left) built of Kenner muck was ruined by shrinkage of the organic material.





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SCS Soil Scientist B. Spicer (above) tells a reporter and planning commission member about limitations of the organic soil beneath marsh grasses.

the old grass, which begins to decompose rapidly.

Some organic soils are 10 feet or more thick. They will subside several feet the first year after drainage and about an inch a year thereafter, depending on the level of the water table.

Aulick said the survey information will help planners make recommendations for general land uses. For example, it will show which land should be used for residential, commercial, light and heavy industrial purposes, where parks and playgrounds should be, and how sewage and drainage can best be done.

New Orleans is one of the first major metropolitan areas to program soil facts into computers to aid in making land use decisions. Soil properties including texture, wetness, and thickness of organic layers, along with other resource data such as population densities, will be programed.

"This way we can rapidly determine the areas best suited to each urban land use and avoid costly mistakes," Aulick explained. The soil survey also will help evaluate the soil problems and costs when it is necessary to modify the soil, remove it, or design special foundations or structures to overcome soil problems that cannot be removed or corrected.

The Planning Commission will make the survey available to the public as well as use the information in its own programs. SCS will continue to give technical help in choosing land uses and designing conservation treatments based on soils and other information.

Almost everybody agrees that most of the soils around New Orleans are not the best for building. But, as Aulick points out, "They are what we have to work with and I think the soil survey will help us put the land to its best use."
—Dayton Matthews and S. A. Thibodeaux, soil scientist and district conservationist, SCS, New Orleans. La.

Job well done a swimming area

C alvin Leftwich's accident led to the construction of a swimming area on his North Dakota farm. It would require swimming to restore the damaged nerve muscles in his leg.

With the help of the Soil Conservation Service through the Towner County Soil Conservation District, a small dam was built and the excavation area in the pool made deep enough to maintain fish in this northern community where ice often freezes to a depth of 3 feet or more.

But very little snow fell during the winter and expected runoff from the watershed was almost nil. Leftwich decided to pump water from a larger coulee just below the dam to provide water for boating and swimming.

His family handplanted some 50 individual trees to give shade and beauty to a selected picnic area. The picnic area and dam were grassed with native sod to provide quick erosion cover to these areas.

The Agricultural Stabilization and Conservation Service costshared the dam and pool development and windbreaks to surround the pool area. The Bureau of Sport Fisheries and Wildlife furnished bass and bluegill to stock the pond.

Leftwich has not said how much swimming he has done in his new swimming area, but he and his family have a beautiful recreation area only ½ mile from their farmstead that provides fun for all—swimming, fishing, boating, and picnicking, a quiet place to rest and enjoy the beauty of nature; and a job well done—FRANK A. HOBBS, district conservationist, SCS, Cando, N. Dak.

When the Norwood Hills Country Club in St. Louis, Mo., set out to install an irrigation system—with improvement of greens a special objective—the path to tee-off led straight to the office of the St. Louis Soil and Water Conservation Distict.

The outcome was the customary agreement between landowner and district board. The difference was in the setting, one in an urban area with recreation the prevailing land use.

The Norwood Hills Club agreed to install all works of improvement as listed in its conservation plan, with the Soil Conservation Service giving technical assistance.

Available water would not be enough to keep the course in top condition. It was evident that a reservoir would be needed. SCS conservationists selected the site for the impoundment. Soil, geological, and topographic investigations showed the site feasible. SCS engineers designed the dam.

Fill material came from a nearby small watershed, which resulted in another smaller lake.

In time the system was in operation, with water going to points in

Putting conservation on golf course is par for district

the 300-acre layout through 13 miles of pipe. Two pumps deliver 1,300 gallons a minute when operating.

Water comes on by program, with time clocks set to start the system and to shut it off at the proper time.

The first summer Norwood Hills used 55 million gallons of water for irrigation. Thirty million gallons of it came from the County Water Company for \$8,000. The rest came from the club's own supply. The lakes cost \$25,000. The club figured the water from the lakes was worth \$5,000, indicating that the lakes would return their cost in 5 years.

The cost of the entire irrigation project came to a quarter of a million dollars, with the delivery system representing the biggest part.

The club placed one of the tees on the earthfill dam and planted ornamental shrubs around the lake borders. Ducks made themselves at home on the water. And members often observed how much beauty had been added to the course.

The supervisors of the St. Louis District look upon the achievement at Norwood Hills as a logical—although a slight departure from the normal—service. In other words, in the district's business, applying conservation to a golf links is about par for the course.—Melvin M. Thompson, area conservationist, SCS, Fulton, Mo., and N. Howard Funk, district conservationist, Kirkwood, Mo.

This reservoir, developed as part of a conservation plan, is a pleasing scene to golfers on the Norwood Hills course in St. Louis. Its waters help to keep the greens in top condition.



Grass solves threat to Navy testing

By John Smithhisler District conservationist, SCS, Lihue, Kauai, Hawaii



Red dust carried by the winds sweeping across Makaha Ridge on Kauai, Hawaii, had been long accepted as a circumstance to be endured.

When the U.S. Navy put a test site there, the dust became a problem to be solved. It was a threat to delicate testing instruments.

Navy and maintenance company officers turned to the West Kauai Soil and Water Conservation District for advice. Soil Conservation Service specialists assigned to the district, after reviewing soil survey interpretations for the area, decided the practical solution would be to seed grass.

Lack of water and constant winds required careful plant selection. Navy conservationists and SCS plant materials specialists agreed that the grasses most likely to succeed were bermudagrass and buffelgrass. Buffelgrass seed for trial plantings was furnished by the SCS Plant Materials Center on Maui.

Low soil fertility, lack of moisture, and traffic from work crews hampered early grass growth. Each of these factors had to be overcome before grass cover could become established.

An arrangement on the use of water allocated to the site helped in providing some water for irrigation. The application of water together with fertilizer has been most important in seeing the project through some extremely rough periods, SCS conservationists said.

The irrigated bermudagrass lawn presents a real contrast with barren conditions of the past, say workers at the site. They expect the buffelgrass to cover the outlying areas.

Another conservation problem at the installation also was solved with selected plant materials. Hazardous gully erosion along the road was eliminated by filling washed-out areas with soil and planting grass as a protective cover. Kikuyugrass was planted in the high-rainfall, high-elevation portion of the steep, winding road. The middle portion of the road was planted to pangolagrass and the dry, lower elevation section of the road was planted to bermudagrass. •

Perched on a 2,000-foot cliff at ocean's edge, the tracking station's sensitive equipment was subject to high winds and swirling dust. Below, District Conservationist John Smithhisler checks growth of giant bermudagrass that now holds the soil.



The year 1965 was one of considerable loss for ill-prepared producers of sugar beets in some areas of Michigan.

Some 8,000 acres of sugar beets were literally blown out by wind.

It was the year, too, when a growing number of Michigan farmers began work on measures to protect land and crop from a repetition of the loss.

Conditions are ripe for a repeat performance in the beet-growing areas of the state. Fields are larger. Bigger equipment makes it possible to have more land ready to blow at a time. About 2,000 acres in Bay County are tiled for drainage each year. And more farmers are growing crops such as beets and beans which return less protective residue to the soil than grain or hay.

In setting out to prevent a recurrence of the 1965 setback, the beet grower usually inventories his land, identifying those areas with a tendency to blow. Next, the farmer plans for protection as a part of a crop rotation, not something to be done if time permits.

Wind-erosion control is accomplished by (1) providing a protective condition on the surface of the soil or (2) reducing the wind velocity to a nonerodible rate.

One practice which will do the job and provide more permanence than annual measures is a tree or shrub windbreak. A windbreak will protect an area of 15 to 20 times its height. The protection it gives more than pays for its cost in taking up productive land. The Soil Conservation Service at its Rose Lake Plant Materials Center has many varieties of plants on trial to find those best suited for windbreaks.

Because of the time it takes before a tree windbreak offers adequate protection, temporary practices must be put on the land. Strips of grain such as oats planted in spring or rye planted in fall give protection to the beet crop. Generally these strips are planted at a rate of 2 bushels an acre, every other row of beets.

An "ounce of prevention" can prevent wind damage

By Deane Meredith

District conservationist, SCS, Bay City, Mich.

Buffer strips of rye, $7\frac{1}{2}$ feet wide and spaced not more than 75 feet apart, will lower the wind velocity and trap moving particles. The open area can be reduced to less than 75 feet. The grain strip should be 10 percent of the open areas. These buffer strips can be planted the preceding fall or left when plowing a rye cover crop in spring.

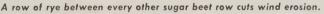
Ridging the soil or leaving it in rough condition will lower the surface velocity of the wind. If soil lumps are doubled in size, it takes a wind eight times stronger to cause the same erosion.

A promising practice being used by an increasing number of farmers is fall-seeded oats. After working the land in the fall, oats are sown at a rate of 2 to 3 bushels an acre, depending on the soil and time of planting. On lighter soils beets then are planted the following spring through the oats with no previous tillage. On heavier ground, tillage may be necessary to prepare a good seedbed. Weeds are controlled with carefully applied herbicides.

Practices such as farming north and south, leaving residues on the surface, and keeping the soil in a rough condition can be done with little change in the accustomed farming operation.

Most farmers are aware of the crop damage and soil loss caused by wind erosion. If the wind carries away a layer of soil the thickness of a sheet of paper, the loss is equivalent to 3 tons an acre. Some effects of the erosion are less readily apparent, such as reduced soil fertility. Soil samples taken 8 feet above the ground during a dust-storm showed a fertility level of 2½ times greater than the field from which the soil came, indicating that the wind sorts and carries away the most fertile soil particles.

Another loss that can be reduced by slowing the wind velocity is related to moisture. A study in Nebraska showed that per-acre yields for sugar beets increased from 21.0 tons to 26.5 tons when the beets were planted between double rows of corn spaced 50 feet apart.





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Special methods solve construction problems

By Joseph H. Hanson and Scott B. Passey

Project engineer and area conservationist, SCS, Ferron and Price, Utah

The need for a large multipurpose dam on a difficult site in the Ferron Creek Watershed Project called for unusual methods of construction at the Millsite Reservoir west of Ferron, Utah.

Since the reservoir was to store water for irrigation and municipal use, it was necessary to stop percolation through the 100 feet of sand and gravel above bedrock at the damsite. A "cutoff trench," constructed by the slurry method, solved this problem.

In order to make a sound dam with the fill material available, a "zoned" fill was designed to use fine-textured materials in the core, gravelly soils for the bulk of the dam, and rock on the faces.

The resulting structure is acknowledged by engineers to be one of the largest and most complex constructed under the Public Law 566 small watershed program. It is

114 feet high, 4,000 feet long, and will create a reservoir of 18,000 acre-feet capacity.

In addition to irrigation and municipal water, the Millsite Reservoir will provide flood protection and water-based recreation. Other features include eight debris basins for flood control, three permanent-level fishing lakes, conservation treatment of private and federal lands of the watershed, and rehabilitation of irrigation systems.

The "slurry trench" was constructed at the upstream toe of the dam to stop the passage of water through the porous valley fill. The contractor, Strong Construction Company

of Springville, Utah, used a dragline with a 120-foot boom and a 12ton bucket to excavate a trench 8 feet wide across the old stream channel down to bedrock. Workmen filled the trench with a mixture of bentonite and water when digging began and completed the excavation with the trench always full of the slurry. The slurry and its weight kept the vertical sides of the trench from caving.

Upon completion of the excavation, a stiff mixture of bentonite and soil was prepared with bulldozers along the edge of the trench and pushed in to replace the thinner mixture. This treatment created an im-



The contractor begins the excavation of the cutoff trench (above) by removing soil and cleaning the bedrock with hand shovels and compressed air. Deeper portions of the trench (right) were completed with a dragline working in a slurry of bentonite.



pervious barrier across the valley under the edge of the dam then constructed over it.

The Millsite Dam was designed to make use of large amounts of well graded gravel at the site. The zoned fill began with a center core of fine-textured materials well compacted to resist seepage. Zone II materials, placed on both sides of zone I, consist of gravelly soils containing less clay and silt but with rocks up to 5 inches in diameter. Then zone III, consisting of rock from 5 to 36 inches in size, was placed upstream and downstream from the zone II.

Two horizontal drains 3 feet thick made of zone III rock were placed

in the upstream side of the dam during construction. A 3-foot horizontal drain was also built in the downstream side above the outlet conduit level, extending into the dam to the middle of the zone II material then vertically to the top of the dam. These drains provide earthquake protection and assure good drainage of the fill as the water level of the reservoir lowers.

The Millsite Dam, with 25 feet of its 114-foot height completed, shows the rock facing placed against the zone II gravely fill. Below is a cross-section drawing of the Plum Creek slurry trench.

Slurry trench stops water, saves money

By Robert C. Bintzler
Assistant state conservation engineer, SCS,
Madison, Wis.

Through a unique method of excavation, a 40-foot-deep trench with vertical sides was dug at a saving of \$100,000 in constructing a multiple-purpose dam in the Plum Creek Watershed Project near Plum City, Wis.

No shoring was required, nor was equipment needed to keep the trench free from ground water. The "slurry trench" method was used to seal porous alluvial material on which the dam was to be built.

The contractor, Link Brothers Construction, Inc., sublet the work to a Los Angeles firm, Industrial Engineering and Equipment Corporation. Sponsor of the construction was the Pierce County Soil and Water Conservation District of Wisconsin.

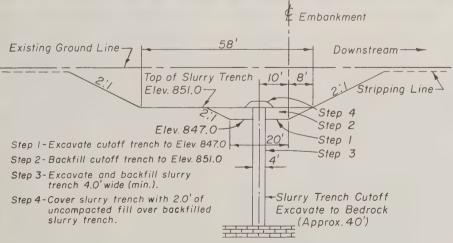
The method used in the excavation was based on the principle that sodium bentonite, when mixed with water, expands. This increases the viscosity and produces a mixture with specific gravity greater than water. The bentonite particles build up in thin layers within the voids of the trench walls, creating a crust impervious to water. The outward pressure of the slurry on the walls prevents sloughing or caving-in. Heavy equipment can work at the edge without danger of sloughing.

The slurry is created in a special mixer where the bentonite is bombarded with jets of water at 100 pounds per square inch pressure.

After the mixing, the slurry is circulated in a holding pond by pumps to keep the bentonite in suspension.

In the Plum Creek Project 6 percent of bentonite by weight was enough to maintain the proper vis-





SLURRY TRENCH CONSTRUCTION DETAILS

cosity and density. Density of the slurry was kept at 65 to 85 pounds to the cubic foot.

The contractor used a dragline with an 80-foot boom and a 11/2 cubic-yard bucket 5 feet wide. Boulders and cemented gravels made the operation slow and difficult. It was necessary to modify the design of the bucket and to build a special ripper to loosen the material in the trench.

When too much sand became suspended in the slurry, it was necessary to remove the sand, to keep the density below 85 pounds per cubic foot. A machine operating on the principle of a cream separator was used for this purpose.

It was also necessary to clean sand and other material from the trench bottom during excavation. An air-lift pump that worked like a vacuum cleaner sucked up sand, gravel, and cobbles up to 6 inches in diameter.

Backfill material consisted of a mixture of the bentonite slurry with silt, sand, and gravel up to 3 inches in size. The backfill was placed with a clam-shell bucket starting at one end of the trench. As the trench was filled, excess slurry was pumped into a holding pond for later use in the dam.



Straight and narrow, the slurry trench nearing completion (above) cuts across the valley floor. The bucket on the dragline (below) was modified to rip cemented gravels in the alluvium.



4-Hers concerned about environment

Six national winners in the 1970 4-H Conservation of Natural Resources program will each receive \$600 educational scholarships provided by John Deere and Company.

The winners are:

David Buerr, 16, of Gilroy, Calif., on the basis of his outstanding work in fighting erosion. He constructed 15 gully-control structures, planted seedlings, and entered a conservation float in a parade.

Lorin Cass, 19, of Hasty, Colo., by transforming his family's rundown farm into a highly productive

Mike Sumner, 18, Sumner, Ga., by rebuilding and stocking four fish ponds and virtually halting soil erosion on his family's farm.

Rachel Koontz, 18, of Fort Wayne, Ind., for carrying out an analysis of conservation problems and practices in housing developments in southeast Fort Wayne. She found that natural water was draining in a manner that would ruin drain plains laid out by the city.

David Shafer, 18, of Titusville, N. J., for building a dam and organizing a program to educate children on conservation of natural resources. He learned how by keeping his lawn from eroding and the river bank from washing out.

Tom Dake, 16, of Armour, S. Dak., for getting the soil on his grandfather's old farm in shape by repeated plowing and disking, thus saving his family more than \$5,000. He learned from his 4-H forestry project and other projects including beef, electric, sheep, and health. ◆

Shining river



Agencies move to restore stream that thrilled Stevenson

By Donald B. vonWolffradt Hydraulic engineer, SCS, Harrisburg, Pa.

"And when I asked the name of the river from the brakeman and heard that it was called the Susquehanna, the beauty of the name seemed to be part and parcel of the beauty of the land . . . that was the name, as no other could be for the shining river and desirable valley."—ROBERT LOUIS STEVENSON, Across the Plains

The Susquehanna River Basin has changed since Stevenson wrote those words over a century ago. Floods, pollution, and poor land use have gnawed away at the basin's beauty. And strip-mined hills and sediment-clogged streams have taken further toll.

In 1961, Congress called upon several federal agencies and three states to find ways to make the "shining river" glisten again for future generations. A coordinating committee made up of representatives of these agencies gave direction to the study.

The assignment was a big one. The Susquehanna River has 27,500 square miles of drainage. It is the largest river entirely in the United States that flows directly into the Atlantic Ocean.

The Soil Conservation Service mapped soils and rural social patterns, studied upstream flooding and agricultural trends, determined erosion losses and agricultural water needs, identified opportunities for upstream water-based recreation developments, and found solutions to rural water-resource problems. It depended heavily on counsel from the basin's residents.

Studies indicate that nearly 11 million acres are not properly protected to conserve soil, prevent sedimentation, and reduce runoff. This includes 140,000 acres of coal-mine spoil areas in need of vegetation and other conservation measures.

Other problems are flood damages that total more than \$6 million each year in upstream areas alone. The need for water-based recreation is intensified since the basin is in an area of large and rapidly expanding population centers.

Most of the river's rebirth will come about through combining work of several agencies. SCS will provide technical assistance for planning and installing needed land-treatment measures for soil and water conservation on the nonfederal lands of the basin. It will provide planning assistance, engineering services, and cost-sharing for the installation of multiple-purpose watershed projects under Public Law 566. Recreation will be an objective in many of these projects to meet increasing needs.

More than 2½ million acres will need conservation-treatment practices applied during the next 15 years. Included are 180,000 acres that need accelerated land treatment upstream from reservoirs to reduce sedimentation rates. The intent is to conserve and improve natural resources, establish a balanced agriculture, provide an improved and more stable agricultural economy, reduce flooding and sedimentation, and improve the quality of living of the residents in the Basin.

If all goes as planned, one day Americans will understand what Robert Louis Stevenson meant when he wrote Across the Plains.

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Cooperation stops floods in the Kickapoo Bottoms

Kansas

If you ask a landowner in the Kickapoo Bottoms along the Missouri River in Leavenworth and Atchison counties in Kansas how the people there solved their flood problems, it is likely he would have a ready answer.

"We worked it all out together," he might say. "Cooperation, a lot of it."

The farmers of the Kickapoo Bottoms had worried with flooding for many years. Originally the flooding was from the Missouri. A levee along the river in 1962 as part of the U.S. Army Corps of Engineers flood-control program corrected that.

But the farmers still had to contend with flooding that came from 1,169 acres of upland and from the bottom land itself.

The solution recommended by specialists of the Soil Conservation Service was a series of floodwater dams in the upland area with a ditch the length of the bottom lands to carry runoff.

The 10 landowners joined others concerned with land use in the area—telephone company, pipeline firm, Missouri Pacific Railroad, local representatives of the Rural Electrification Administration, Leavenworth County Board of Commissioners, and the Kickapoo township board.

The group applied to the Leavenworth County ASC Committee for cost sharing under the Agricultural Conservation Program. SCS specialists working through the two soil conservation districts designed the system of dams and drainageways, side ditches, and floodgates.

The completed project includes five flood-detention dams in the hills that control drainage from 242

acres through 16 lateral ditches entering a main ditch. The diked drainage ditch is 20,300 feet long, 4½ feet deep, and 16 feet wide at the bottom. The ditch parallels the railroad and the face of the uplands and picks up runoff from 450 acres of steep uplands and 1,198 acres of flat bottom land.

The main ditch empties into Salt Creek near its junction with the Missouri River. At the outlet end of the drainage ditch, a pipe has been installed with a flap or floodgate to prevent floodwaters from the Missouri River and Salt Creek from backing into the ditch. Each lateral ditch also has a flap gate.

The telephone company moved its lines from the site of one of the dams. The township board relocated a road to cross one of the dams, in place of a bridge. The county cooperated in furnishing culvert pipe where a county road crosses the ditch.

In summer 1969, two extremely heavy rains occurred even before the upper 2 miles of the ditch was completed. Excess water drained into the ditch, and no damage occurred to crops. Another time the Missouri River was high, and water was backed against the outlet flap gate.—FRED L. TRUMP, information specialist, SCS, Salina, Kans.

Texas

No-wash crossings are winning friends

County Commissioner John Avery of Bonham, Tex., is known in the Fannin County Soil and Water Conservation District as a friend to farmers, school bus drivers, mail carriers, and others who must use rural roads. Avery is a believer in replacing rickety county road crossings with drop structures of dams that you can drive across and that don't flood or wash out in bad weather. The structures also reduce erosion and downstream sediment damage.

When Avery is ready to replace a bridge, he calls on Soil Conservation Service engineers to help determine whether it is feasible to replace the span with a dam. If so, the dam and a pipe drop structure are designed and laid out by SCS conservationists assisting the Fannin County District. Consideration is given to soils, drainage area, and an emergency spillway.

Most structures have enough storage capacity so the emergency spillways will not be expected to function more often than about once every 25 years. The small lakes above the dam also provide livestock water.

Built with county equipment, the combination bridge and drop structure may cost from \$1,000 to \$5,000, depending upon size. Twenty of the structures have been built so far.—Truman Atkins, district conservationist, SCS, Bonham, Tex.

Wyoming

Facts for growing

A year before the summary of the Conservation Needs Inventory for Wyoming was ready, requests for copies of it began arriving.

Libraries, agencies of government, planning firms, and heads of industries were foremost among those seeking copies of the report.

The Wyoming Water Planning Program made use of information in the summary in developing the Wyoming Water Plan. The identification of land suitable for sustained irrigation and the productivity of these lands within river basin areas were of special concern.

The Wyoming Department of Economic Planning and Development used information from the inventory in developing plans for its projects in the state. In the Riverton

area the information helped determine acreages suitable for sugar beets when the location of a sugar beet processing plant was considered. In Laramie and Goshen counties information was needed on soils suitable for potato growing.

Glenn Hertzler, commissioner of agriculture for Wyoming, regards the summary as a valuable storehouse of information on land use, soil conditions, and areas needing special treatment.

"I have found it to be a most useful reference for basic data in the development of our Agricultural Sector Study and evaluating potential small watershed projects," Hertzler said.

Kenneth R. Sturman, director of the Wyoming Division of Resource Conservation, believes that the inventory will be useful in Wyoming for a long time.

"We will have use for this information as long as Wyoming agriculture is developing," he predicted.—
R. C. Kronenberger, state soil scientist, SCS, Casper, Wyo.

Missouri

Landowners help county keep roadsides green

Vince Hanley, road superintendent for St. Charles County in east central Missouri, believes that seeding rights-of-way after road improvement should be part of every

county's road building plan.

The County Court, St. Charles Soil and Water Conservation District, and Hanley have cooperated in the seeding of rights-of-way in St. Charles County. To encourage this practice they developed a unique agreement with property owners along the roads.

Landowners along each new or reconstructed county road get a letter explaining that the county court will pay for grass seed, covercrop seed, fertilizer, and mulch used for seeding the right-of-way if the landowner will do the work. Hanley, as road superintendent, reports to the conservation district clerk which roads need seeding. The clerk then determines ownership along the road and the length of right-of-way needing seeding.

Using a standard formula of seed, fertilizer, and mulch per 1,000 feet of right-of-way, the clerk computes the amount of materials each landowner is authorized to purchase. After the work is done the landowner notifies Hanley, who inspects the job. If the work is satisfactory, the County Court authorizes payment.

The program is voluntary. Although the program has only been in effect a short time, it appears that about half of the landowners will participate.

Benefits to the county and landowners are already apparent. Brush and weeds are being controlled. Roads are easier to maintain and are safer. Sediment is withheld from waterways, ponds, and drainage ditches. An added bonus is that farms are more attractive and the countryside is more pleasant for travelers, Hanley points out.—Les-LIE F. Volmert, district conservationist, SCS, St. Charles, Mo.

Virginia

Farm is a billboard for conservation

Motorists driving down the eastern slope of the Blue Ridge in Patrick County, Va., get the message: Conservation Controls Pollution. The lush green pastures and the crystal clear pond on Charlie Martin's farm tell the story.

As a cooperator with the New River Soil Conservation District, Martin has turned his farm into a conservation billboard.

A year ago, passing motorists on Highway U.S.-58 saw roadbanks that were eroded and briars and honeysuckle vines cluttering the view of a pond that nearly went dry with every drought.

Together, Martin and Ed Sumpter of the Soil Conservation Service devised a plan to combine beauty and conservation. Martin cleared the ditchbanks and graded them, then fertilized, limed, and seeded them with Kentucky 31 fescuegrass. He built a 500-foot diversion across the slope to carry excess water away from the roadsides to the pond.

The pond now stays full, and the passing public sees it in the setting of a green pasture. Also his work has reduced the amount of sediment going down the road.—Donald L. Ray, district conservationist, SCS, Stuart, Va. •

Charlie Martin's pasture pond.



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Erosion control along highways

By J. Guy Moorefield
District conservationist, SCS, Wichita, Kan.

Soil erosion control is no longer considered exclusively an agricultural matter in Kansas.

One of the biggest users of land in the state, the Kansas Highway Commission, has a comprehensive erosion-control program of its own.

A. A. Holmquist, division engineer at Hutchinson, credits the excellent cooperation between the commission and the Soil Conservation Service at both state and local levels. The commission's program in Sedgwick County, for example, consists of shaping and seeding highway rights-of-way and installing concrete structures according to standards agreed on by the two agencies.

Smoothing and shaping of the



land reduces erosion both on the right-of-way and on adjacent land, which in most cases is farmland. Care is taken to avoid the impounding of water on the right-of-way and on adjacent land.

Sloping concrete structures are built wherever needed to prevent gully formation by water flowing down right-of-way slopes. The structures are usually located at outlets of farm terraces that have been cut by the highway. An 8.5-mile stretch of Highway U.S.-54 west of Wichita, for example, has 63 structures.

The Highway Commission uses SCS soil data and recommended grasses and legumes for seeding along highways and on "borrow" areas. Generally a mixture of native grasses is used.

The commission carefully selects grass mixtures according to the needs of the soil. Sand lovegrass is part of the mixture on sandy soil, alfalfa and clovers on heavier soils. Alfalfa and bromegrass are seeded on the more productive soils. The seeded areas are fertilized heavily.

Highway workers blow old hay over the seedings to form a mulch; special equipment punches the mulch into the ground to keep it from washing or blowing away. In some places jute netting or a thin spray of asphalt is spread over the seedbed to temporarily check erosion until the grass comes through. •



Alfalfa stabilizes slopes of grade (above) crossing over new Highway U.S.-54 near Wichita. Jute netting is used to protect roadside from erosion until grass is established. A. A. Holmquist (left) of Kansas Highway Commission and the author check a new seeding.

Meetings . . .

Ecology heads AASA's educational program

The annual meeting of the American Association of School Administrators will be held February 20-24 in Atlantic City, N.J. "Education '70's—Prelude to the Twenty-First Century" will be the theme, and ecology will be a main discussion topic.

Others include parochial aid, voucher systems, technology, performance contracts, student unrest, open schools, and recruiting superintendents from minority groups.

Resolutions to be considered are on performance contracts, how to handle student unrest, the superintendent's role at the negotiation table, and recruiting superintendents outside the ranks of education.

At this convention there will be what AASA calls the greatest assemblage of educational materials ever put together under one roof. AASA plans to take over one closed circuit cable TV for 5 days and will present 126 telecasts with more than 300 experts on educational topics.

FCF to emphasize ecology

"Ecology" will be one of the subjects discussed at the 4th annual convention of the Family Camping Federation of America February 26-28 in St. Louis, Mo. Of vital interest is what FCF is doing to help preserve the natural resources for future generations of campers.

Other topics to be covered include: "Camping in the Surging Seventies," "The Nation's Economy as it Relates to Camping," "Recreation in Campgrounds," "Good Dealer Displays and Show Techniques," "Will Campers Ruin Camping?," "Are Recreation Vehicle Owners Campers?," "Is Camping Doomed in Public Parks?," and "Recreation Predictions—Fact or Fantasy?"

The FCF is offering its first An-

nual Camping Research Award designed to recognize original contributions to the field of family camping by graduate students in park and recreation management curriculums.

Professionalism is SIA's goal

The Sprinkler Irrigation Association at its annual technical conference February 21-24 in Denver, Colo., will present as its theme, "Building Professionalism Through the SIA."

Among topics to be discussed are: "Water Management Under Sprinklers," "Sprinkling System Operation and Maintenance," "Financing Sprinkler Irrigation Development," and "Turf Irrigation." The panel discussions include qualifications, ratings, and obligations of consultants, contractors, distributors, and suppliers.

ASRM questions environmental quality

"Rangeland, Environment, and Man" will be the theme of the 24th annual meeting of the American Society of Range Management, February 15-18, at Reno, Nev.

In the sessions such topics as rangeland ecology, watersheds, resource planning, ecological resource inventories, socio-economic aspects, and rangeland livestock will be discussed. One session will be held to take up the question, "What is Environmental Quality?"

NACD emphasizes environment, economics

The National Association of Conservation Districts' 25th Anniversary Convention will be held February 7-11 in Chicago, Ill.

Topics include: "Cleaning Up Our Act," "Relating District Programs to Today's Problems," "Project SOAR and the 1971 Conservation Good Turn," and "The Prospects for Agriculture and Resources in the 70's."

NAOC emphasizes today's problems

"National Economic Situation and Outlook for 1971" will be the theme of the National Agricultural Outlook Conference February 23-26, Washington, D. C.

"Agricultural Situation and Outlook" will be discussed in the general sessions; "The Environment," "Medical Care," and "Food," in the family living sessions; "Commodity Situation and Outlook" in the commodity sessions; and "The Rural Labor Force" in the rural life sessions.

Farmers Union meets on environment

The National Farmers Union will present a strong action program centering around environmental and marketing problems of farmers at its annual convention February 24-27 in Washington, D.C.

Dates and places

February 7-11, National Association of Conservation Districts, Chicago, Ill.

15-18, American Society of Range Management, Reno, Nev.

20-24, American Association of School Administrators, Atlantic City, N.J.

21-24, American Road Builders Association, Los Angeles, Calif.

21-24, Sprinkler Irrigation Association Technical Conference, Denver, Colo.

23-26, National Agricultural Outlook Conference, Washington, D.C. 24-26, Land Improvement Contractors

of America, Indianapolis, Ind. 24-27, National Farmers Union, Wash-

ington, D.C. 26-28, Family Camping Federation,

26-28, Family Camping Federation, St. Louis, Mo.

March

5-7, National Wildlife Federation, Portland, Oreg.

5-11, Association of General Contractors of America, San Diego, Calif.

7-8, The Wildlife Society, Portland, Oreg.

7-10, Association for Supervision and Curriculum Development, St. Louis, Mo. 14-19, American Pulpwood Association, Boca Raton, Fla.

14-20, National Wildlife Week.

16-19, National Rivers and Harbors Congress, Washington, D.C.

27-Apr. 1, American Society of Planning Officials, New Orleans, La. ◆

Review



Provisional Indicative World Plan for Agricultural Development. By FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1970. FAO, Rome. (Distr. by UNIPUB, Inc., New York), 2 vol. 672 pp. \$8.50.

Summary and Main Conclusions. 72 pp. \$1.50.

The Provisional Indicative World Plan is described as "a synthesis and analysis of factors relevant to world, regional, and national agricultural development."

It proposes a strategy for agricultural development to meet the needs of an additional 1,000 million people expected in developing countries by 1985. It is not a "plan" in the conventional sense of the word nor a detailed blueprint for development, but rather an analysis of the major issues which are likely to be facing world agriculture in the 1970's and early 1980's, together with some recommendations regarding the most important directions in which efforts should be made.

These key objectives are listed:

- (1) Securing a staple food supply for populations growing at rates of 2.5 to 3 percent per year.
- (2) Improving the composition of the diet to correct dietary deficiencies.
- (3) Earning and saving foreign exchange by economic import stabilization.
- (4) Providing increased opportunity for employment both within agriculture and in agri-allied industries.
- (5) Increasing productivity through intensive land and water use.

The report states that the attainment of these key objectives will not be feasible without a wide range of supporting actions—in the fields of marketing, credit, extension, training, and institution building. The plan emphasizes the need for closer

World plan for agricultural development

coordination of activities leading to the development of integrated services to farmers and indicates possible models.

Irrigation and drainage are given a key role in increasing the intensity of land use, as are flood control, soil conservation, and other land-improvement measures.

The plan points out that trained manpower for the essential agricultural services will, either quantitatively or qualitatively, and often in both respects, be a major constraint on agricultural development. It points out the potentially acute shortage in the supply of intermediate or technical-level personnel, those who do the fieldwork providing agricultural services. This emphasizes the need for an unprecedented training program for middle level technical personnel.

The Indicative World Plan contains a wealth of material on agricultural development problems in the developing countries. What should be done is spelled out in some detail. Just how it will be done will remain the subject for continuing debate.— Joseph B. Rogers, assistant to the administrator for foreign affairs, SCS, Washington, D.C.

Resources and Man. By the Committee on Resources and Man, National Academy of Sciences—National Research Council. 1969. W. H. Freeman and Co., San Francisco. 259 pp.; illus. \$5.95; paper \$2.95.

How fast are we depleting our natural resources? Resources and Man is the report of a special investigative committee formed by the National Research Council to answer this question. The credentials of the authors are impeccable. Their research is thorough, objective, and global in scope. Their findings are neither alarmist propaganda nor comforting pap.

Their conclusions: World re-

sources are in rather serious trouble, owing chiefly to a large and rapidly increasing world population. Mineral reserves are fast nearing exhaustion, even allowing for the discovery of new supplies and more efficient extraction techniques. Fossil fuels cannot fulfill our energy needs much longer. And the committee believes we are quickly approaching the finite limits of food production—both on the land and in the sea.

Coming in the wake of all the ecological horror stories heard in the last couple of years, these foreboding prophecies may seem a little less than awesome, even anticlimactic. But Resources and Man is not typical of environmentalist literature. It is not a sentimental, impassioned outcry. It is an objective, methodical assessment of world resources, compiled as carefully and impartially as an accountant's ledger. The sources are listed; the formulas on which the calculations were based; the allowances which were made for new finds and scientific breakthroughs. The results are obviously phrased by men who are very professional, very cool, and quite systematic.

Resources and Man is must reading for everyone connected or concerned with the environmental crisis. It is not fun. It is authoritative. It is not fiction. It is hard, cold reality. It is ammunition for the environmentalist, a reprimand for scoffers, and a good reference for everyone.—Frank T. Cross, Information Division, SCS, Washington, D.C.

The Ecosystem Concept in Natural Resource Management. Edited By George M. Van Dyne. 1969. Academic Press, New York. 383 pp., illus. \$6.50.

Earth Day and the subsequent excitement over the environment have made the once obscure word "ecosystem" part of the common tongue. Everyone agrees that, whatever it

is, it needs to be protected.

Familiarity with a word, however, is not necessarily the same as understanding what it means. Even experts sometimes stumble when they try to explain the concept of the ecosystem.

More than a year before Earth Day, the American Society of Range Management organized a symposium on "the ecosystem concept in natural resource management" at its 1968 annual meeting. The principal papers of that symposium are now available in book form. Readers who are willing, and able, to think their way through these detailed and analytical treatises will find the word taking on meaning of real substance.

The 10 chapters are organized into four sections dealing with (1) the meaning, origin, and importance of the ecosystem concept, (2) its use in research, (3) its use in resource management, and (4) instilling the ecosystem concept in training.

Editor Van Dyne's preface and his concluding chapter on training clearly state the meaning of the concept and explain its importance in resource management. He emphasizes the complexity of the ecosystem in reality and argues for the interdisciplinary approach to research and practice, for "no one man can encompass all of the required specialities and knowledge." The individual chapters on grassland ecosystems, watershed ecosystems, and the interpretation of range, forest, wildlife, and watershed management in terms of the ecosystem concept fully support his thesis.

The book will be a useful tool for the professional conservationist of any specialty interested in integrating his efforts with those of his colleagues in the new ecological approach to resource management. If its meaning could be injected into the public understanding to the degree that the word itself has been accepted, there would be real hope for the environmental movement.—B.O.

Contours of Change, The 1970 Yearbook of Agriculture. 1970. USDA. 406 pp., illus. \$3.50.

The 1970 yearbook does a dramatic job of portraying recent changes in farming and in the processing and marketing of farm produce. Better yet, it provides an insight into the significance of the changes for all Americans—farmers and consumers alike.

The yearbook's main sections—
"The Agricultural Revolutions,"
"Country and City—One Nation,"
"America's New Role in Agriculture," "A Look into the Future"—
give some idea of the scope of the book. It is well illustrated, with both color and black-and-white pictures, some with startling impact.

Contours of Change is a readable book and important reading for anyone interested in natural resources, economics, sociology, the environment.—Wallace L. Anderson, director, Resource Development Division, SCS, Washington, D.C.

New publications

Economic Impact of Second-Home Communities, a Case Study of Lake Latonka, Pa. By RICHARD N. BROWN, JR. 1970. USDA Economic Research Service ERS-452. 55 pp., illus. Describes the transformation of 1,275 acres of Pennsylvania farmland into a 1,600-lot second homesite subdivision with a 270acre lake. Estimates that the first \$7 million of development activities at Lake Latonka could generate \$14 million of business activity before 1970, with less than 40 percent of the total accruing to local businessmen. Variable use and special use expenditures of homesite buyers and their guests generated \$2.6 to \$6.7 million of economic activity during 1965-70, with half of this total accruing to local business men. After 1970, however, use expenditures are expected to generate \$0.5 to \$1 million annually.

Air Pollution Injury to Vegetation. By Ibrahim Joseph Hindawi. 1970. U.S. Department of Health, Education, and Welfare, Public Health Service, Environmental Health Service, National Air Pollution Control Administration Publ. AP-71. 44 pp., illus. \$1.25. Presents cross sections illustrated in color of plant cells and air spaces that serve as passages for pollutants. Dramatic photos of many plants and leaves show such plants as

tobacco, pinto beans, lettuce, petunia, rose, potato, apple tree, etc., injured by hydrocarbons and nitrogen oxides producing ozone and PAN (peroxyacetyl nitrate), nitrogen dioxide, ozone-sulfur dioxide synergistic action, low concentrates of flourides, chlorine, ethylene, or others.

Sericea Lespedeza, Its Use and Management. By WALTER J. GUERN-SEY. 1970. USDA Farmers' Bull. 2245. 29 pp., illus. \$0.35. Gives the growth and management pattern of sericea lespedeza, a perennial summer legume that is well suited to the Atlantic Coast States and makes good growth westward into eastern Texas, Oklahoma, and Kansas and as far north as the southern half of Illinois, Indiana, and Ohio. The plant yields a good quality of hay and is one of the best upland pasture legumes for humid parts of the South. Sericea serves as a good soil-improving crop, provides excellent cover on steep or eroded slopes, and is most effective in waterways or outlets, field borders, and in stabilizing roadbanks and strip-mine spoil.

Major Statistical Series of the U.S. Department of Agriculture, How They Are Constructed and Used, Vol. 9, Farmer Cooperatives. By BRUCE L. SWANSON. 1970. USDA Agr. Hbk 365. 9 pp. \$0.25. The handbook will consist of 11 volumes: Agricultural Prices and Parity, Agricultural Production and Efficiency, Gross and Net Farm Income, Agricultural Marketing Costs and Charges, Consumption and Utilizazation of Agricultural Products, Land Values and Farm Finance, Farm Population and Employment, Crop and Livestock Estimates, Farmer Cooperatives, Market News, and Foreign Trade, Production, and Consumption of Agricultural Products.

The Look of Our Land, and Airphoto Atlas of the Rural United States: North Central. COMPILED BY SIMON BAKER AND HENRY W. DILL, JR., 1970. USDA Agr. Hbk. 384. 63 pp., illus. \$0.75. Brings together the text of USDA Agriculture Handbook 296, Land Resource Regions and Major Land Resource Areas of the United States, with photos to show examples of land use and related information according to an established regional and area classification of United States land resources. The album-sized booklet shows characteristics of 28 landresource areas in three regions comprising all or parts of 14 North Central States.

U.S. Population Mobility and Distribution. 1969. USDA Economic Research Service ERS-436. 39 pp., illus. Charts on recent trends.

Recon...

Environmental education, recreation, and preservation are primary purposes of a 125-acre regional arboretum being developed near Austin, Minn. Twenty-eight groups, including the Mower County Soil and Water Conservation District, the Hormel Foundation, and the city of Austin, supported acquisition of the nature study area for use by schools in northern Iowa and southeastern Minnesota. The district and SCS helped the Austin Park and Recreation Department and Planning Commission prepare plans based on soil information. There will be opportunities for students and other visitors to see watershed and flood-plain management; critical area stabilization; woodland and wildlife management; and mechanical erosion-control practices. Interstate Highway 90 will give millions of visitors easy access to this outdoor laboratory.

Last fall a Georgia catfish farmer harvested 2 tons of catfish for each 100-foot section of raceway, according to State Conservationist Cecil Chapman. That's equivalent to 60 tons of catfish for each surface acre.

Developers paid half of the construction costs of the first dam completed in Virginia's Pohick Creek Watershed Project after it was enlarged for recreation at their request. Lake Braddock will be the nucleus of a planned community of low to moderate income homes. The developer deeded the permanent pool to the county and gave a perpetual easement for the 30-acre flood pool. Management of the lake will eventually be the responsibility of a community association. Residents of

the Lake Braddock subdivision will be the first to enjoy the recreation and flood-protection benefits of this unusual Public Law 566 project. It was designed to cope with land use changes in a watershed undergoing rapid, intense urbanization. When completed, eight dams will reduce expected sediment yield by 75 percent and save public funds that would otherwise have been used to dredge Pohick Creek and the Potomac River.

"There probably is an 'environmental crisis.' Most of the major writers with science background seem to agree on that. They agree on the inevitability of results, assuming continuation of certain current conditions. They disagree on the time scale within which those results will occur and their reversibility . . . However, it is undeniably clear that we are smackdab in the middle of a 'crisis about environment.' . . . We must start talking about environmental concern for what it is-an attitudinal set, a feeling. It is a social movement with all the force for revolutionary change that concept implies. If we fail to recognize this, we'll blow it."-R. W. Comstock, director of environmental affairs, Northern States Power Company, to the National Science Teachers Association, March 1970, Cincinnati, Ohio.

A California landscape architect has built an experimental park on blacktop at the John H. Bader Elementary School in Huntington Beach, Calif. Because of the prohibitive costs of removing pavement and replacing soil, Richard Bigler spread gravel for drainage on the 3-acre site and installed a series of raised planters. They are filled with a soil mix and graded from 2 to 6 feet to simulate rolling land. Ivy is used as ground cover in addition to lawns planted in the unusual boxes over the blacktop. The root balls of more than 100 mature trees were enclosed in plastic bags before planting. Roots will break through as they readjust and grow in their new environment. Bigler's planter-park concept may be used to develop mini-parks in large parking lots reports Western Landscaping News.

"Scientists realize the dangers inherent in the fact that they must now advertise their activities in order to obtain public funds for the support of scientific research . . . One of the concerns is that this necessity . . . leads to extravagant claims concerning the results to be expected from scientific research . . . promissory notes are dangerous because they encourage a lazy acceptance on the part of the public of the belief that scientists can solve all the problems of the modern world by inventing new technologies and counter technologies. One need not worry about cigarette smoking because they will discover a cure for lung cancer; or about environmental pollution because they will find a way to clean the air of our cities and the water of our streams and lakes . . . "-RENE DUBOIS, former presidential science adviser.

The Tahoe Regional Planning Agency is using the first results of a detailed soil survey begun in the spring of 1968 and finished last year. A general soil map and report and 11 other interpretive maps are being used to prepare plans for controlled development in the Lake Tahoe Basin. The survey was originally requested by the Tahoe Basin Association of Soil Conservation Districts (composed of districts from California and Nevada) before Congress had even discussed the creation of the Tahoe Regional Planning Compact.

Completed conservation plans for the reclamation of a small lake benefit approximately 40 homes in the Jeto-Lake Association of Hendricks County, Ind. Over the past 2 years, landowners have dealt with severe bank erosion, a gullied emergency spillway, and ailing structure outlet. and weed growth in the 10-acre lake. Technical assistance was given by the Hendricks County Soil and Water Conservation District and SCS. A private engineer who lives in the subdivision supervised construction of the new concrete chute for the lake outlet. Practices applied will reduce future maintenance expenditures and beautify the area.

From the Administrator:



A big job being done, and to do

Conservation, it is well for us to reflect, is a fabric of various contributions in effort and responsibility.

The land user—the owner and the operator—has the most important role. He bears the responsibility to use the conservation measures needed on his property, and to maintain them so they function as intended over a long period of usefulness.

The professional planner and technician are cast in essential supporting roles of their own. It is their responsibility, working with landowners, to plan and design measures that fill the need in each instance and promote efficient operation. Their work must be practical and easy to maintain. It must be in harmony with the landscape, and pleasing, if possible, to the eye.

The contractor, whose machines snape the earth, has responsibility to adhere to the designs and specifications, producing well-finished installations, with operations controlled in a manner to avoid or minimize water and air pollution.

It is up to the rest of us, as citizens, to recognize the contributions of these dedicated individuals who, through their own efforts, protect our resources, use them wisely, and make our Nation an increasingly satisfactory place for living.

Achievement over the decades of our history has been impressive. Still, most of the conservation job is ahead of us. As some appraisers of our task have said, we must run fast merely to keep up with it.

We know that erosion and sediment damage are still a major and stubborn conservation problem. Billions of tons of soil are being removed and redeposited by water in transit every year. About a fourth of this goes into the Nation's streams.

We need to be concerned about the continuing loss of soil from our farm and ranch lands. Erosion along an estimated 425,000 miles of rural roads increases maintenance costs, creates safety hazards, and mars our landscape. And surveys show that some 148,000 miles of streambanks are subject

to excessive scouring and cutting. Construction areas and building sites are known to be major sources of sediment output.

Soil conservation measures, skillfully fitted to each varying need, can and must produce for the people of America a pattern of resource use and management that will meet production, environmental, and living standard objectives.

In a single year machines move a billion cubic yards of earth in the conservation process—in earth dams, terracing, and grassed waterways, and in the grading and leveling of land for efficient water use.

Into the conservation process each year go hundreds of thousands of cubic yards of concrete, millions of feet of corrugated metal pipe, tile, concrete pipe, and aluminum sprinkler pipe.

Getting vegetation established on pasture, rangeland, and critical areas is requiring many million dollars' worth of fertilizer, lime, and seed.

Accustomed as we are to hearing astronomical figures in the daily news, such amounts tax our comprehension. They indicate, however, a tremendous rate of progress in our overall conservation task and a vast contribution by the men and machines involved in this phase of our conservation job.

America is investing heavily in the conservation of all resources and moving rapidly toward even greater expenditures for the protection and improvement of our total environment. This means broadening responsibility to be shared by all of us engaged in the design and application of conservation patterns across our American land.

Kenneth E. Sant

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Streambank victory

L andowners along some of Colorado's famed, fast-flowing streams, who long have been troubled by the loss of land to streambank erosion and the pollution of the water resource by sediment, are slowly but effectively finding answers to the problem.

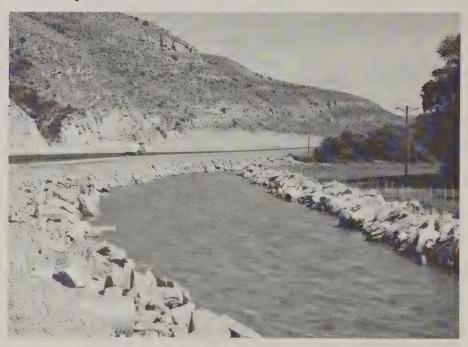
It is a problem affecting whole drainage areas, not individual holdings alone. And landowners and the conservationists helping them are quick to point out that methods are not all the same and that only further studies can develop overall solutions.

Gilbert Myers, who ranches along the Williams Fork River south of Craig in the Yampa Soil Conservation District, for years had watched the river eating away his hayland. After consulting with Soil Conservation Service engineers, he decided that a series of rock jetties would reduce the damage being done.

He placed the jetties in winter when the stream was low and rock could be hauled across meadows with a minimum of damage to the hayland. He built the jetties 30 to 40 feet long and about 6 feet high, angled at about 45 degrees to deflect the flow away from the banks.

His efforts have been successful. Erosion of the banks has been stopped.

Rich and Homer Winder, whose ranch is on the Little Snake River west of Craig, had reported a simi-



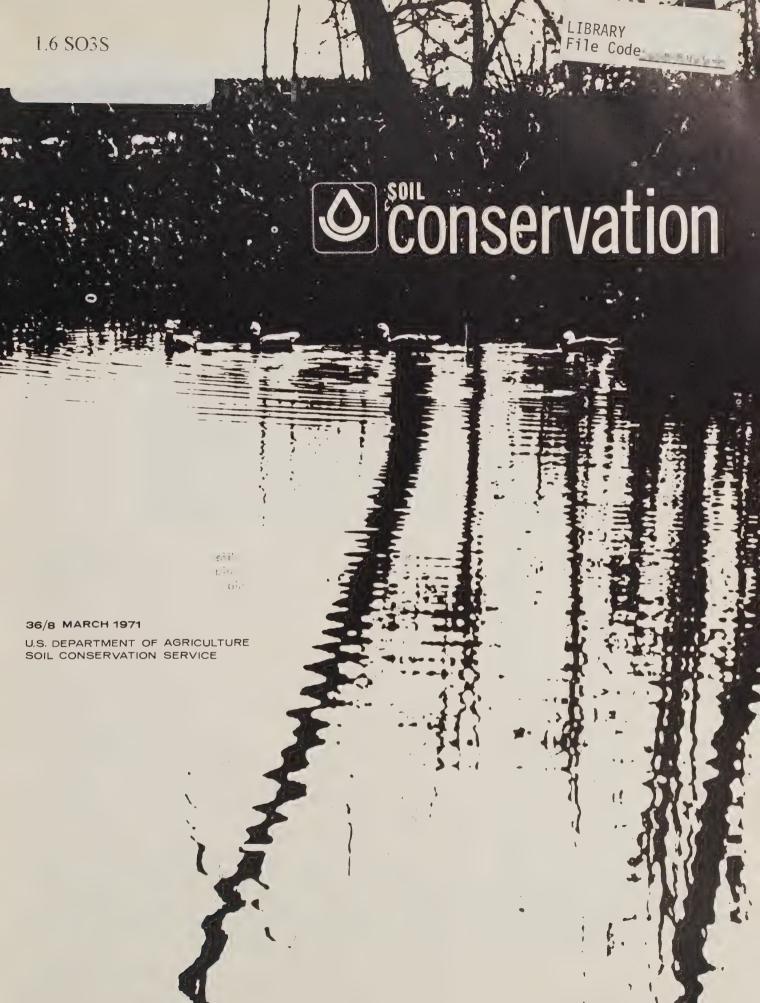
Riprapped banks offer protection for section of new Colorado highway.

lar problem. Last year they finished the leveling of 54 acres for irrigation. It was imperative that the banks of the river be made stable.

Through the winter the Winders hauled 1,200 cubic yards of rock 5 miles to the site. They riprapped the banks with some of the rock and used the rest for a series of jetties.

The Colorado Highway Department had streambank-erosion problems on a new stretch of road between Hamilton and Craig. The department needed to protect both road and adjacant farmland. This was done with a blanket of rock riprap on both sides of the stream. Jetties were not suited to the problem here because of the stream's limited channel.

The Soil Conservation Service furnishes technical assistance in the design, layout, and installation of the practice needed for streambankerosion control. The Rural Environmental Assistance Program helps with a portion of the cost.—Harland G. Ross, engineering technician, SCS, Craig, Colo.



© conservation

March 1971, Vol. 36, No. 8

When it's all wet . . .

Halfway between land and water is a complex and vied-for property called marsh or wet land. Whether it borders the ocean or a tiny creek, it is a vital part of the life of many wildlife species and a scenic part of the horizon. It's also prone to being filled in or drained for farming or freeways or many urban uses; dredged for minerals or easier navigation; or flooded for larger lakes. Helping identify wetland areas, encourage their dedication for wildlife, and make better habitat through conservation work is one job of SCS. Several articles this month tell of efforts by landowners, local conservation districts, SCS, and others in this regard.

Elsewhere in the issue other action for wildlife improvement is detailed, along with stories of conservation accomplishment on other fronts.

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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Garden for geese

"A gigantic garden designed especially for geese." That's how specialists of the Ohio Division of Wildlife describe the Mosquito Creek Goose Management Refuge in northeastern Ohio.

Management of Canada geese, the main purpose of the facility, is in high gear on 1,200 acres touched by northern shores of Mosquito Creek Reservoir, the state's second largest manmade lake. This 10-milelong haven for bass and walleye helps to lure the feathered travelers.

Since work began on the refuge in 1958, Ohio has moved up measurably in the world of wild geese. Work done at Mosquito Creek and in two other areas (Killdeer Refuge in Wyandot County and Mercer Refuge in Mercer County) has increased the state's population of Canada geese from 2,500 in 1958 to 40,000 in 1969.

Just over a decade ago, Mosquito Creek Refuge was only a tract of rough land, choked with brambles and scrub brush where long ago men had tried farming and failed. To help change this wasteland into a paradise for geese, the state Wildlife Division enlisted the aid of a number of federal, state, and local agencies—including the Trumbull

County Soil and Water Conservation District, headquartered in Cortland, Ohio.

Through the district, the Soil Conservation Service surveyed the wet soils of the site, made an inventory of needs, and helped the Wildlife Division work out a long-range program of development to "provide the needed wide expanse of open land composed primarily of corn, fall-seeded grain, and low-growth meadows as feeding areas for Canada geese."

The wild Canadian is a field-feeder with a taste for grains. Above all, he is a creature of water and

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wide open spaces who mistrusts close quarters of any type. The conservation plan for Mosquito Creek was tailored to suit his needs perfectly. Cropping to provide corn, small grains, clover, and seed-producing grasses is practiced on 350 acres. Cornstalks are chopped down in the field, as geese are skittish of standing plants. Extra corn is harvested in normal fashion, then distributed to concentrated feeding areas.

Cropped land on the refuge benefits from proper liming, fertilizing, and crop rotation. Rough, hard-to-manage fields have been seeded to permanent meadows to protect the soil and to provide "grazing" for geese. Regular annual mowing prevents invasion by scrub brush.

The conservationists found it necessary to install an extensive system of drains in the area before its wet soils could be cultivated or harvested. This drainage system includes miles of carefully channeled waterways that form open spaces highly prized by the big waterfowl. Its inter-connected ponds and lagoons offer the birds many sanctu-

aries for resting, nesting, and feeding.

Long, level ditches on the refuge look like drain channels, but aren't. They are moats that protect the geese from predators. The soil removed to create these ditches is placed on the downslope sides and seeded, creating added space for loafing and nesting.

These conservation measures have helped to increase the state's goose population sixteenfold since 1958. Even more encouraging is the fact that Ohio refuge areas produced more than 8,000 locally hatched geese at the most recent tally. Fourteen years ago, the score was 250.



This is the real payoff, according to Game Protector Norm Myers. Mr. Myers says, "The geese tend to return to places where they learned to fly. It's a sure thing we get a lot of hometowners stopping here now. And they lead a lot of transients in with them."

Several hundred permits for shooting blinds within a 5-mile radius of Mosquito Creek are taken out annually by eligible landowners. Daily shooting fees for hunters range from \$20 to \$25 a person. And the shooters spend money locally for food, lodging, gas, and provisions, adding to the benefits from the refuge. What an individual waterfowler spends to bag a single goose may range all the way up to \$75 a bird.

More profound values of neighboring communities are seen in the increasing numbers of students, birdwatchers, tour-groups, and other visitors who are drawn to witness the spectacular flights in spring and fall. They outnumber the gunners considerably.—Bernhard A. Roth, public information officer, SCS, Upper Darby, Pa.



All for the proud Canada goose, ditches were dug that don't go anywhere, and a pumping system installed that keeps the right amount of water in them.





Channels save the Bayou

By Irvin L. Sonnier and Dolan Kleinpeter

State construction engineer, SCS, Alexandria, La., and district conservationist, SCS, New Iberia, La.

Crawfish, frogs, ducks, fish, and furbearing animals *like* a Louisiana watershed project—and so do the Cajun bayou dwellers who hunt them. The Lower Bayou Teche Watershed Project was designed to make the environment better for wildlife as well as for people.

In the years from 1930 to 1960, roads, canals, and other structures were built in the area's marshes. These caused water levels in the wet lands to change daily. The marsh dried up when it shouldn't have, and at other times water got too high. This destroyed plant life and drove away the birds and animals dependent on it. It also ruined the habitat of muskrat and other creatures which must have a constant water level at which to build their nests or dens.

The Lower Bayou Teche Project was designed to stabilize water levels

in the marshes and at the same time to improve 168 miles of drainage and flood-prevention channels. Begun in October 1965, the project is sponsored by the Iberia Parish Police Jury in cooperation with three soil and water conservation districts—Iberia-Vermilion, Lafayette, and St. Mary.

The Police Jury is constructing a fourth of the project with its own funds and equipment, and the Soil Conservation Service is providing the rest of the funds under Public Law 566.

To provide outlets for local farmers' cropland drainage systems, ditches were excavated through marshes in the southern part of the project area adjoining the Gulf of Mexico. But, channel improvement through these low-lying sites was not designed to convert any of the wet land to farmland but to improve the

wildlife habitat of the area. Spoil from channels excavated in marshes, swamps, and wooded areas was shaped with a bulldozer (or, in wet areas, a dragline bucket) to create wildlife habitat and make maintenance and access easier.

Contractors in close cooperation with the local landowners placed spoil in the marsh adjacent to the channel in such a way that it could be used to create ponds for crawfish, ducks, and geese. Landowners already have constructed eight such ponds. Spoil banks not only serve as levees for marshes and ponds but also provide cover and homesites for rabbits, deer, and other animals. And they afford easier access to the wildlife areas.

Rights-of-way were cleared with bulldozers where conditions were dry. In wet areas the trees were cleared with power saws. Spoil was

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placed around the stumps on the berms of the channels and then dressed to provide for maintenance access.

Landowners cooperating with the soil and water conservation districts are installing pipe drops at the outlets of small ditches to prevent erosion and keep sediment from clogging the main ditch. Agricultural Stabilization and Conservation Service provides cost-sharing on the pipe drops. Other erosion-control practices are also part of good land treatment.

Ovide Lancon, a life-long resident of Iberia Parish, said, "The watershed program is one of the best things that has happened to the marsh as far as wildlife is concerned. It has restored the marsh to what it was back 50 years ago. Crawfish, frogs, ducks, and furbearers are

more plentiful than they have been in many years. The fishing in the watershed channels also has improved from what it used to be here."

Pointing to an area dotted with muskrat lodges, he summed up the effects of the project like this: "Up until last year there were no muskrats on my land. Now there are nutria, racoon, and mink in here, too. The nutria like to come to this high levee to rest, and they feed on the plants growing in the fresh water. Mink and coon feed on crawfish in the water. There are a couple of fellows who trap in here to supplement their income. Last year. each man averaged about \$2,000 in fur sales. And rabbit hunting's better since they put the levee in. You can get a mess of rabbits here anytime. now. Duck hunting's good, toohunters usually get their limit. The ducks feed on smartweed and other plants that grow in the shallow water." Lancon's 400-acre marsh is fast becoming one of the choicest hunting and fishing spots in the area. And he employs 18 to 20 people to trap and haul crawfish to local markets.

A side benefit of the project is improved navigability of area waters. Water in many of the channels formerly was too shallow for boat travel. Now, parish residents can paddle instead of push along their watery byways.

The Lower Bayou Teche watershed is a good example of the excellent cooperation of many agencies to provide drainage, flood protection, and wildlife for all of the people in the watershed.

That others might enjoy wildlife

Cordelia Stanwood's love of wild things and unspoiled places inspired her to become an author, ornithologist, and nature photographer. And the nature refuge and study area she founded 50 years ago in Ellsworth, Maine, is a living memorial to her interest. Several thousand visitors each year come to experience nature at its best at Birdsacre Sanctuary. Along the refuge's shaded paths echoes a medley of song from dozens of species of birds—tempted here by the conservation efforts of Birdsacre's managers.

In 1959, Birdsacre Sanctuary came within a spade of being "developed" as a modern motel. Thanks largely to the concern of area resident Chandler Richmond, Ellsworth citizens purchased the 50-acre site and incorporated it as a foundation to preserve the peaceful natural surroundings. Richmond serves as curator.

Richmond's first tasks were to restore the hundred-year-old Stan-

wood family homestead as a museum and to re-open the old trails first established by Miss Stanwood. He began a continuing program of identifying and labeling species of trees, shrubs, wildflowers, ferns, and lichens. When the Hancock County Soil and Water Conservation District (which includes the town of Ellsworth) was formed in 1964, Richmond requested technical help through the district in improving the property. He worked with SCS conservationists to develop a conservation plan for the sanctuary.

Since then, 500 wildlife-attracting shrubs of five different species have been planted on Birdsacre. Nine more nature trails have been completed, winding 2 miles through the scenic habitat of the refuge. Two wildlife ponds have been constructed—with a spawning bed for the stocked brook trout. These and other conservation practices were accomplished with technical help from SCS and the Maine Forest

Service. The Agricultural Stabilization and Conservation Service provided cost-sharing help.

During the 10-year history of the new Birdsacre, 99 species of birds have been sighted there. Deer are frequent visitors, to feed on the flat peas that thrive on the banks of the larger pond.

Richmond's interest and efforts led him to be elected to the Hancock County District board. He served 3 years as vice-chairman. He also has been active in the district's program of conservation education. Scouts and school groups in large numbers have heard Richmond's wildlife lectures and gained an appreciation of natural surroundings from them.

Birdsacre Sanctuary is an ever more popular memorial to a pioneering environmentalist and to some who are working today that others might enjoy nature.—Kenneth J. Laflamme, soil scientist, SCS, Ellsworth, Maine.

700,000 ducks from farm ponds in Montana

By Clayton E. Ogle State resource conservationist, SCS, Bozeman, Mont.



Seven hundred thousand ducks—that's a lot of pinfeathers, a lot of wings whirring over the wet lands. And a valuable bounty for the sportsman and the naturalist who prize the wild, free beauty of migrating waterfowl. And that number of waterfowl is produced annually on ponds built and maintained by Montana farmers and ranchers, according to a recent study in 10 soil and water conservation districts.

Twice each year the lanes of the Central Flyway are churned by the tireless wings of great flocks of ducks and geese. Most of the mallards and pintails among these are produced in the prairie pothole area of Alberta, Manitoba, Saskatchewan, the Dakotas, Minnesota, and Montana. The myriad of small, glacial ponds in this area also teem with blue-winged teal, American widgeon, and gadwall. These surface-feeding ducks prefer the small ponds of the prairies to larger water areas.

Unfortunately, intensive agricultural use, road building, and other development have reduced natural duck-producing areas on the prairies. The feeding and nesting areas provided for wild waterfowl by the naturally occurring glacial potholes have suffered from the onslaught of civilization and technological progress.

Landowners continue to ask for drainage assistance, but threefourths of the requests do not result in projects because of wildlife and related values.

Some landowners and developers of the area have begun to realize that their marshes and wet lands, and the wildlife they support, are important economic assets as well as irreplaceable natural resources. In an effort to supplement the dwindling waterfowl habitat in the prairies, many landowners have constructed ponds on their property to provide room for ducks to feed, nest, and raise their young. In the past

30 years, 60,000 ponds have been installed by Montana landowners with assistance from Rural Environmental Assistance Program and other USDA cost-sharing programs. This adds up to 144,000 acres of water created, at an average of 2.4 acres a pond. Several thousand additional ponds have been built without cost-sharing with technical assistance from Soil Conservation Service through soil and water conservation districts. Each year more than 1,400 acres of water area in about 600

A shallow Montana farm pond makes good waterfowl habitat and is fun for people too.





District Conservationist O. M. Mabry (above) checks an oil-drum nest built for mallards. Hoped-for result of man's extra care is a nest full of tomorrow's ducks (below).



ponds is added to the total. Most were installed primarily for livestock water, but waterfowl has reaped the multipurpose side benefits of water development.

What does all this pond construction mean to the waterfowl in the area? The 10-district study indicates that up to 100,000 broods of waterfowl are produced on the ponds each year. An average of nearly two broods containing 14 waterfowl per pond was observed by researchers. And, as we have said, that adds up to 700,000 ducks. The study indicates up to a third of Montana's waterfowl production could come from rancher built ponds.

Conservationists have found that Canada geese will nest on ponds as small as 2 acres if suitable nesting sites are available. Islands for nesting geese and ducks protect them from predators and increase the numbers of young that survive. Ranchers are starting to modify pond construction techniques to include islands for loafing areas and nesting sites. Some are placing bales of straw on the islands, a practice which makes them even more attractive as nesting sites.

SCS specialists in cooperation with Montana State University, U.S. Fish and Wildlife Service, and the Montana Fish and Game Department are urging pond builders to include islands by cutting through peninsulas, by building small mounds, and by isolating natural high areas that can be surrounded by water. The islands add nothing to the costs of pond construction.

Montana landowners in increasing numbers also are applying land-management practices to supplement pond development. Grazing systems to keep cattle away from ponds during the nesting season improve the manmade wet lands, as do sediment-control measures such as grassed waterways, and seeding of feeding areas to plants appetizing to water-fowl. Concerned ranchers know the value of their marshes and are working to provide good wetland habitat for future waterfowl in the prairie pothole country

Goose hunters' heaven

By Ervin A. Pavlik
District conservationist, SCS, Columbus, Tex.

E agle Lake, Tex., has achieved fame as "the goose-hunting capital of the world." And with good reason—more than a million geese come to Texas each year, and a great many of these birds are drawn to the wet lands and lush ricefields of the Eagle Lake area.

Local farmers know the value of their wildlife resources, which draw nearly a million dollars a year into the economy of their community. And they know, too, that their rice crops help keep the geese—and the dollars—coming in. SCS conservationists assist the Colorado Soil and

Water Conservation District in helping Eagle Lake landowners improve their cropland for both rice and goose production.

A 1-year rice, 2-year fallow, or a 1-year rice and 3-year fallow rotation is the most common system. After yielding a crop of rice, fields can readily be managed to provide excellent habitat for waterfowl.

John Clipson is one of the local rice growers cooperating with the Colorado District in managing his land for ducks and geese. Clipson floods several of his ricefields each year to provide roosting and nesting areas for waterfowl. These fields are hunted only rarely, when the geese have moved to some other area to roost.

Clipson hunts waterfowl only in the morning, allowing the ducks and geese time to feed and rest during the afternoon. This practice is unwritten law among the region's hunters—it is followed by all seven of the hunting clubs in the district, as well as by most individual hunters.

Clipson, like other sportsmen and landowners in the district, is helping Eagle Lake keep its reputation as a Mecca for geese—and for hunters. •



A diet of rice at Eagle Lake.

This pond is for the birds

By James H. Canterberry

District conservationist, SCS, Charleston, W. Va.

High above the Kanawha Valley's vast industrial complex in southern West Virginia, Harvey and Anne Shreve's country home has a different view—a unique wildlife pond.

Nearly all the ponds and lakes in West Virginia are manmade since the state was not blessed with many natural lakes. The Shreves' pond is unusual because it is near the top of a hill and because it was constructed "just for the birds."

The Shreves purchased their 60-acre tract on Middle Ridge in Kanawha County in 1965. Harvey owns and operates an automobile dealership in St. Albans.

The Shreves soon became cooperators with the Capitol Soil Con-

servation District. Soil Conservation Service conservationists helped them develop a conservation plan to enhance most of the land for wildlife.

A must for the plan was a pond, according to Mrs. Shreve. Working with Ernest Ashcraft, SCS conservation technician, they selected a suitable location that could be viewed from the site for their new home.

The pond was designed with curving sides and tapered ends so that it would have a natural look. The pond is shallow to enable the growth of cattails, rushes, and other water plants that would attract birds. The final touch was to seed, fertilize, and mulch the dam and all disturbed areas to prevent erosion. Cost-sharing assistance was provided by the Agricultural Stabilization and Conservation Service.

Once filled by rain, the pond became the home and visiting place for many species of birds and animals. A fascinating array of aquatic plants began to appear around the edges, and the half-acre pond soon had created its own ecosystem.

Harvey and Anne Shreve are enthusiastic conservationists. Although she has no formal training in ornithology, she was cited in October 1970 by Governor Arch A. Moore, Jr., for having adanced that science in the state. The Shreves have given their attention to development of natural resources for environmental improvement.

Much of their land was left in its native vegetation for wildlife habitat. A grown-up field was converted from brush to grass to improve nesting areas for birds and rabbits. Almost all the wildlife food is provided by native plants. Mowing of

Mrs. Shreve views some of her shallow pond's flora that do a good job in attracting fauna.

open fields is delayed until late July, allowing time for most birds and rabbits to nest.

As avid bird watchers, the Shreves band many birds. Last year, they were visited by 160 different species. They have added five bird records to Kanawha County and three records to the state. The three birds not previously recorded as seen in West Virginia are the sandhill crane, scissortail flycatcher, and buff-breasted sandpiper.

The Shreves' wildlife pond looks like a giant mirror when viewed from their new octagonal-shaped home. Although they are only 10 miles from Charleston, the state capital, their pond has proved a success as a watering and feeding place. They have seen deer, raccoon, rabbits, foxes, and even a black bear.

And they thought their pond would be just for the birds. ◆

Wet lands improved for duck habitat

By James T. Hardy

District conservationist, SCS, Mahnomen, Minn.

The prairie potholes of Mahnomen County, Minn., annually produce a large number of migratory birds.

The desire for agricultural land was putting a squeeze on these prime breeding and nesting areas, and the breeding grounds were diminishing. But conservation-minded citizens are resisting this trend—with success. Among them are Erwin Steiner and his son Jack.

With help of the Mahnomen Soil and Water Conservation District and concerned Federal agencies, they have developed a large parcel of land for the preservation of waterfowl and upland game.

The development was on 225 acres of formerly unproductive land that was too wet for agriculture and not wet enough for good waterfowl production.

In fall 1966, the Steiners built two water-control structures to retain runoff and provide needed water storage. The result: Two wetland areas, of 4 and 13 acres, for waterfowl production.

More development was done in June 1967 when the Steiners blasted 42 waterfowl breeding and courting potholes with an ammonium nitrate mixture to create shallow areas of open water. These 20- by 30-foot pits were spaced about 250 feet apart throughout the remaining wet land.

The pits were made from 4 to 6 feet deep so that natural plant succession would not close them in with vegetation, and an improved habitat

would result for the attraction of ducks. The rest of the area was preserved in its existing state of introduced and native grasses for nesting cover.

In 1967, six broods of ducks were produced on the area. In 1968, 16 broods were observed using the site—six canvasbacks, five mallards, three blue-winged teal, one pintail, and one redhead. Observations this spring indicate that the waterfowl use will increase again.

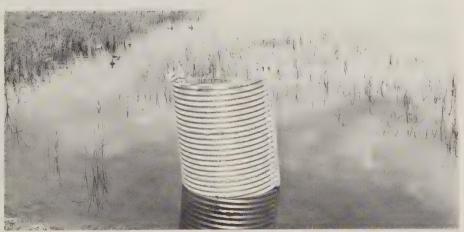
With growing demand for hunting sites, the Steiners decided that fee hunting might have possibilities. In fall 1967, a \$1,500 renewable lease was drawn up and signed for hunting privileges in the newly developed area. The lease was renewed by the group in 1968. "We've been paying taxes on this wasteland for years and never have received any return from it until we put it into wildlife," Erwin Steiner said.

The Steiners say that wildlife, as a farm byproduct, can yield a profitable income and at the same time assure the presence of wildlife for the future.

Cost of the Steiner development, including materials for structures and blastouts, was about \$2,580, of which 80 percent was paid through Rural Environmental Assistance Program cost-sharing. Initial investment by the Steiners was \$516. The formerly unproductive land showed a profit of nearly \$1,000 the first year.

Biologists of the Bureau of Sport Fisheries and Wildlife in Fergus Falls and the Soil Conservation Service helped the Steiners plan the development. The Steiners, encouraged with the results in duck production and financial return from hunting leases, have requested SCS to study feasibility of another waterfowl impoundment in the area. •

Ducks enjoy Erwin and Jack Steiner's "blasted" pond.



If it's a marsh use it like one

By Robert S. Pollock
Soil scientist, SCS, Hebron, Nebr.

How do you tell a marsh from a mudpuddle? It's not as simple as it sounds, as wetland enthusiasts and soil scientists in Nebraska's Central Plains can tell you.

This part of the Great Plains is marked by many shallow depressions that have no drainage outlets. These are areas of low relief whose gently sloping soils form basins that trap rainwater. The rainwater basins range in area from a few acres to several hundred acres. Some basins are dry; others contain lakes 5 or more feet in depth. Many of them have developed into wetland habitats that contain typical marshdwelling species of plants and wildlife. Many other basins are used for pasture or cropland. Some are being used to trap and recover irrigation tailwater. Still others have been eliminated by tile drainage or by highway fills.

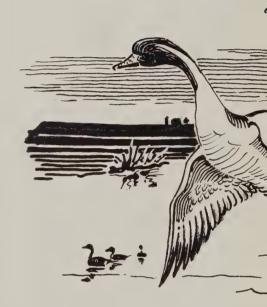


SCS soil scientists faced some thorny problems in classifying the soils of these basins to aid in land use decisions. Earlier soil surveys had identified more than half of the basins as having Scott soils, a type which is now classified as suitable for some cultivation. It was apparent that not all of these interpretations were correct. The scientists decided that a study was needed.

During the spring and summer of 1970, SCS soil scientists examined more than 900 of the basins in an 18-county area. They found that 163 of them, comprising 11,820 acres, actually contained marshlands or intermittent lakes.

Marshland in the lowest elevations is class VIII—best suited for wildlife. SCS conservationists, in helping landowners decide on land use, point out these areas and encourage landowners to dedicate the land to that use. And they can give technical assistance in developing high-quality wildlife habitat on the wet land. Cost-sharing is supplied by the Agricultural Stabilization and Conservation Service.

A common soil pattern for basins where there is marsh is that the lowest elevations are surrounded by an area of Scott soil. Then on slightly higher, better drained position the soil will be Filmore, then



Wild creatures (above) and man can benefit from use and improvement of Nebraska's upland marsh areas (right).

Ralph Hawkins enjoys a morning in his marsh.



up to either Butler, Crete, or Hastings. The latter are usually class II or better, whereas Filmore is class III-w, both suitable for agriculture with some limitations.

Where soil, water, and plants are properly classified, it clears up many questions about wet lands and their value for wildlife.

Competition for land and pressures on agriculture are great. But state and federal agencies working together can help landowners in Plains soil and water conservation districts share more of their land with wildlife.

Ralph Hawkins of Hebron, Nebr., is one who is glad to share with wildlife. He and John Ells and Dr. C. M. Parker have developed hunting grounds on an 80-acre tract, 65 acres of which is marsh. They raised small islands in the marsh and built concrete blinds on them for use when the water is deep. Other times they use barrel blinds. On the Hastings soil, class I and II-e, they planted 500 redcedar trees to tame the winds and serve as sanctuary for thousands of songbirds. Near the edge of the marsh they built a cabin with a porch that slopes upward from the door so they can see out over the marsh.

"You don't have to have a gun to enjoy ducks," Hawkins says. "The language they use when coming in to land, the graceful way they glide into the marsh, and the colors they display are all added benefits." Both sportsman and artist, Hawkins often trades his gun for a sketch pad. He did so to create the ink drawing that helps tell this story.

"I've been hunting ducks since the days when we used live decoys," he recalled. "Years ago a Nebraska youth could hunt free anywhere. Then the fee days came along, and after that the lease agreement." Hawkins was a hardware merchant in Hebron for 44 years and grew up in the heart of the Central Plains at Grafton. He has seen the whole transition, both as sportsman and supplier, from good hunting to poor and back again.

Bucks and beef

By Billy Craft
Biologist, SCS, Minden, La.

Wildlife farming is as much a part of Dr. N. D. Morgan's 2,400-acre ranch near Minden, La., as cattle and timber are.

His game management area is rapidly becoming a favorite hunting spot for sportsmen in northern Louisiana.

"One of the largest bucks killed in this area—242 pounds live weight —was taken on my farm last season by a local hunter," Morgan said.

Morgan, an agronomist with the American Potash Institute, first bought the ranch with the intention of raising beef cattle. "However, I soon realized that my mixed hardwood-pine forest and open fields also were suited for a new and untapped source of farm income," he said. His wildlife project was started about 5 years ago.

Deer are the primary game sought by the hunters who annually lease Morgan's farm for hunting rights. Since 1964, the annual harvest has increased from 10 legal bucks to 24 this season. Nineteen of these bucks were killed during the 9-day still hunt from November 8 through 16. Other game animals hunted on the farm include squirrel, dove, quail, and rabbit. Wild turkeys have been released by the Louisiana Wildlife and Fisheries Commission on two nearby locations.

Through the Dorcheat Soil and Water Conservation District, Ray Smith, state SCS biologist from Alexandria, and the Minden SCS staff helped Morgan plan an incomeproducing hunting enterprise.

Morgan cleared "shooting lanes" 100 feet wide and a quarter mile apart on 823 acres of mixed hardwood-pine woodland. The lanes vary in length. They go north and south, east and west in a checkerboard pattern. The openings have been planted with white clover, fescue, and bahiagrass. Narrow strips of lespedeza have been planted near

the edges of the woods for bobwhite quail. These wildlife openings serve as shooting lanes and also supply the "edge effect" that most kinds of wildlife need. The Agricultural Stabilization and Conservation Service provided cost-sharing assistance on seed and fertilizer.

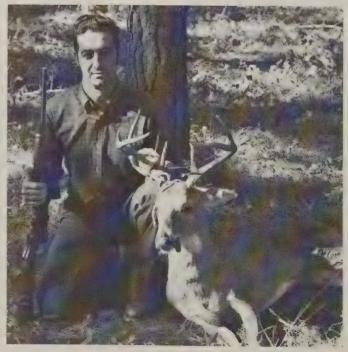
Honeysuckle is common in the woodlands, and Morgan says this is the number-one browse plant on his farm. In fact, plans call for planting root sprouts and seeds of honeysuckle in small openings in the woodland.

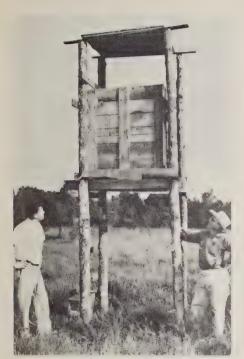
Sixty-five elevated deer-shooting platforms are built at intervals along the lanes to provide an added measure of safety in addition to hunting convenience. Before going to his stand, each hunter stops by the clubhouse and places his name tag on a map of the area on which the stands are located. Since all hunting is from the stands, a quick glance reveals the location of other hunters.

"Our hunting system is possibly the safest there is," Morgan empha-

Quail (left) and deer are just two of the popular crops on Dr. Morgan's farm.







Dr. Morgan (right) and the author view one of the elevated shooting stands that add safety and convenience.

sized. "For this reason we have many hunters who come here to train their sons."

There are now 30 members from the Shreveport area who pay fees for themselves and their families to hunt and fish on Morgan's land and water. His first year of operation was in 1964. Business has picked up each year since, he said.

As testimony to Morgan's good management, almost all of the sportsmen who hunted there this year have either killed a deer or at least had a shot at one.

There are nine small, well-stocked recreation lakes on Morgan's ranch. They range in size from ½ to 3 acres and yield large catches of bass and bream to fishermen.

Morgan also sends prime beef to market each year from his 150 head of cattle. They graze some 500 acres of improved pastures. His woodland yields a dual crop—wildlife and choice trees.

Dr. Morgan's farm is a fine example of how land can be managed for wildlife and outdoor recreation and still produce beef and timber. •

Mark of a rancher

Increased ranch income, good grass and cattle, abundant wildlife, and two conservation awards mark Desiderio Trevino's ranching progress in southern Texas.

Trevino won the Webb Soil and Water Conservation District's Conservation Rancher Award in 1966 and the American Society of Range Management's Grazing Excellence Award in 1970.

Trevino started managing the 5,000-acre ranch on the northeast bank of the Rio Grande River in 1961. The salty clay soils of the ranch supported a dense stand of chaparral brush and little grass. Poor condition and low productivity of the rangeland had resulted from a long history of heavy grazing use. Explorers and travelers from Mexico crossed the Rio Grande and grazed their animals in the vicinity of the ranch as early as 1690.

In an effort to get more out of his rangeland, Trevino signed a cooperative agreement with the Webb District in May 1963. With help from a range conservationist of the Soil Conservation Service, the young rancher developed a complete conservation plan. The plan was designed to develop, properly use, and protect the soil, water, plants, and wildlife on the ranch. It required a drastic change in ranch operation.

Trevino first reduced his cowherd by half to bring livestock into balance with forage being produced. Next he built 6 miles of cross fence to give him better control of grazing. At the same time, he began a vigorous brush control and range-seeding program. He has rootplowed and seeded more than 1,000 acres of brushland and chained an additional 1,800 acres. These practices enabled him to carry out a program of sound grazing management, including regular deferment and proper grazing of all pastures.

Brush control and range seeding have been done in block strips and natural patterns to preserve wildlife habitat. In 1961, hunters who held a season hunting lease on the ranch harvested six whitetail bucks. In 1969 the ranch yielded 12 bucks and a good quail harvest.

Calves were more plentiful, too—an 85-percent crop of 450-pound calves in 1969 compared with a 40-percent crop of 300-pound calves in 1961. In all, the ranch net return for 1969 was more than twice what it was in 1961.—Raymundo T. Margo, Jr., district conservationist, SCS, Laredo, and Donald T. Pendleton, range conversationist, SCS, Bryan, Tex. ◆

Desi Trevino looks at the buffelgrass that now graces his ranch instead of pricklypear and brush.



Farm planning in Wisconsin . . .

More conservation by the dozen

In the Oconto Soil and Water Conservation District in Wisconsin, new district cooperators are taking to conservation in bunches, perhaps a dozen at a time.

The district leaders like it that way.

Some of the groups have been brought into the conservation fold because outlets for the disposal of excess surface water are sometimes hard to locate on a single farm. Others were formed because of common problems or opportunities in resource development. And still others . . .

There's the Morgan group. The interest of some of them was touched off by a training program at the Northeast Wisconsin Technical Institute at Green Bay.

Slides on soils caught the attention of several young farmers from the Morgan area. Their study of the soils in their area led to discussions of needed conservation work, broad resource management, and development opportunities.

A series of source conservation planning meetings followed. The group agreed on a goal of a conservation plan for each farm. At the second meeting each member received a folder containing an aerial photo and a soils map of his land. Step by step each landowner began planning for the use and conservation treatment of his land.

By locating roads, buildings, and other landmarks he "found himself" on the photo. Then he outlined his fields and designated present land use with symbols—"C" for cropland, "W" for woods, "P" for pasture. An appropriate symbol indicated his fences. Each field showed approximate acreages.

Based on knowledge of the land gained through working with it and studying the soils information, each landowner selected the needed conservation practices. For wet cropland the decision was easy—it needed surface water-disposal systems. But where were the outlets and were they deep enough? Could they be designed to protect and maintain the wildlife wetland habitat? What was the best erosion control on upland fields?

Since these questions were hard to answer without observing land conditions, the group unanimously decided they needed some on-theland help. Before the meeting ended, each member made an appointment with Soil Conservation Service specialists assisting the Oconto Soil and Water Conservation District.

Out on the farm specialists and owners reviewed soil resources and discussed preliminary decisions on conservation treatment. They dealt with specific problems as they found them. Sandy knolls or steep, eroding cropland fields were planned for trees with additional help from the Wisconsin Department of Natural Resources and the Agricultural Stabilization and Conservation Service.

Little Suamico and Pensaukee rivers flow through farms of the group. Here was an opportunity to improve a warm-water fishery. First, the banks needed riprapping, sloping, seeding, and fencing to control bank erosion and reduce sediment.

Two members made plans to work on this together. They hired a contractor who had access to a limestone quarry and could complete the necessary sloping and rock placement. The following fall a neighbor joined the group and protected the banks of the stream on his land.

Where gullied draws were washing away soil, the Morgan group decided to seed grassed waterways. They planned windbreaks around farmsteads and along roads to cut down on snow accumulation and heat loss from their homes. They



Stabilizing John Bergh's streambank will save his barnyard and improve water quality for people and wildlife.

set aside acreage for wildlife, located pond sites, and noted timber management needs. Designated drainage outlets became community projects serving two or more farms.

Overall costs of the conservation work were lower because the contractors did not have to move in and out of small jobs, thereby avoiding moving costs that saved up to \$50 or more per farm. In addition, when these larger jobs were offered to contractors, the unit bid price was

lower—a direct saving to landowners and also to the Government when cost-sharing was involved. When SCS specialists could provide technical assistance on one group job, it was a saving of time—an indirect saving to the landowner as a taxpayer. Whether riprapping a streambank or providing an outlet for a community drain, working in groups has paid in Oconto County.—GLENN D. GARVEY, district conservationist, SCS, Oconto, Wis.

Conservation in action . . .

A dam for all reasons

South Dakota

A township road going to pieces—farmers low on livestock water—and severe flooding on low-lands. The answer? A combination road-dam, water-retarding structure, and wildlife development, the first one in Grant County, S. Dak.

It's called the Rude-Hasvold Dam, after the two Grant County Conservation District cooperators whose interest in more livestock watering facilities led to the group project.

About 13 acre-feet of water will be stored in the 3-acre reservoir for

livestock and other uses on the Bud Rude farm. A pipe runs through the dam embankment to provide water for livestock on the Verlin Hasvold farm.

The old township road's narrow top and steep side slopes were eroding, and a concrete culvert was badly in need of repair.

Now the top of the dam, which serves as the road, is 32 feet wide—much wider and safer than the old road fill. The roadway is 8 feet higher. And the county commissioners saved the cost of culvert repair.

The road-dam also will help reduce downstream flooding. The storage area of the reservoir at the emergency spillway of 102 acre-feet will help stabilize the grade of the watercourse.

Three-fourths of the 2,000-acre drainage area is grassland in good condition, the rest is in small grain under a conservation cropping system. Little erosion will result; but the dam is designed to trap whatever sediment is produced, adding pollution control to the project benefits.

Hunting, fishing, and other recreation are other benefits. The reservoir will serve as a watering station for upland game. Ducks and geese will enjoy it, too, and it will be stocked with fish.

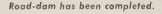
SCS made a feasibility study for the group project and aided in design of the dam, and the Agricultural Stabilization and Conservation Service provided cost-sharing.—HAROLD L. STOLTENBURG, district conservationist, SCS, Milbank, S. Dak.

Maine

Flatpea—new plant for wildlife

Seeding abandoned logging roads to herbaceous plants such as flatpea can provide excellent wildlife habitat, curtail erosion, and suppress

Sod is being stripped from area to build road-dam.









Flatpea on an old logging road gives wildlife an edge—and cuts erosion.

woody growth to keep the road in good condition for future harvesting of wood.

In June 1967, on the University of Maine Experimental Forest in Old Town, a quarter-mile of inactive logging road 12 feet wide was seeded to NY1157 Flatpea (Lathyrus sylvestris). The seed, obtained from the SCS Nursery at Big Flats, N.Y., was broadcast on a disked soil seedbed at a rate of 60 pounds an acre. Before seeding, experimental plots were treated with various combinations of lime and fertilizer. The Plaistead stony loam and stony silty clay loam were tested before treatment and found to be acid with a pH of 4.7. Later soil tests showed the lime treatments raised the pH to 5.5.

By November 1968, 10 of 17 plots had stands of flatpea varying from fair (30-49 percent ground cover) to excellent (80-100 percent ground cover). No tree seedlings were found on these plots. The poorly established stands (less than 30 percent ground cover) were all found on poorly drained, wet soils. Sedge, alder, and willow were widespread on these wetter plots. Flatpea growth was more vigorous and lush on unshaded plots although successful stands were established

in shaded areas. Successful pea stands were found on plots with and without fertilizer treatment.

Use of flatpea leaves for food by ruffed grouse in August and November was verified.

Additional plantings of flatpea on the Bradford Wellman property in Dixmount, Maine, are well established. The plant has been used on a spoil bank from a large pond to create a border between a grassland opening and a wooded area. Wood roads have also been successfully seeded on the Frye Mountain State Wildlife Management Area in Montville.

In the White Mountain National Forest in New Hampshire, seedings similar to those on the Maine Experimental Forest were planted in 1967. Forest Service Biologist Gary Carr reported use by deer the following year. These plantings have developed into dense stands of flatpea. The viny growth suppresses brambles and small-tree seedlings.

Flatpea also is useful on dry, gravelly soils such as roadcuts and borrow areas. It can help speed the return of waste areas to productive wildlife habitat.—SANFORD D. SCHEMNITZ, associate professor, Wildlife Resources, University of Maine, and DAVID ALLAN, biologist, SCS, Orono, Maine.

Illinois

Lake Dongola is ready in the nick of time

Completion of Lake Dongola, near Dongola, Ill., was not official on the night of the fire, August 26, 1970.

But its water—official or not—helped to control a blaze that threatened the village.

Mayor Leo H. Keller reported that fire companies of Dongola and three neighboring towns pumped 350 to 400 gallons a minute for 3 hours in containing the fire. He said the town's former supply would have been exhausted in 30 minutes.

The fire destroyed a downtown produce company.

The 70-acre Dongola lake is a part of the Little Creek Watershed Project. The community provided funds for adding municipal water to flood-prevention features of the project. Assistance came from the Soil Conservation Service and Farmers Home Administration. Sponsors were the Union and the Pulaski-Alexander soil and water conservation districts and the town of Dongola.

The lake's official completion date was September 10.—Howard W. Busch, state conservationist, SCS, Champaign, Ill.

California

A plant for stock and wildlife

Lana vetch has many uses in the foothill areas of California's Sacramento Valley—for grazing by cattle and sheep and use by several kinds of wildlife.

After 8 years of use by cooperators of the Elk Creek Soil Conservation District, Lana vetch has proved itself. They have seeded it in many ways, broadcasting, drilling, and scattering it with hay and livestock. They have grazed it with several kinds of livestock, at different times of the year, and harvested the seed with and without oats, barley, and wheat, and have grown it on a wide variety of soils.

Lana vetch, an annual legume, is a selection of woolypod vetch (Vicia dasycarpa) developed by the Soil Conservation Service Plant Materials Center at Pleasanton, Calif. Its most desirable feature is its ability to produce forage and a good seed crop even in years when late spring rains do not occur.

One of the best uses for this plant is permitting it to mature for a dry summer livestock feed. Because of its high-protein content, it is a high-quality feed during the long dry forage season of California range. With average climatic and soil conditions, dry forage yields from Lana vetch in this area range from 4,000 to 7,000 pounds an acre, about

twice the production that can be expected from native annual grasses.

Lana vetch produces 50 to 100 pounds of nitrogen an acre which is available to the companion grasses that grow through the winter rainy season. Thus, the early growth of the grass, as well as the vetch itself, is an important source of early green feed. Unlike some other legumes, Lana has never been known to cause bloat.

Livestock will not eat Lana vetch when it is in the flowering stage, thus permitting a good seed crop.

Lana, like other vetches, makes legume hay approximately equal to alfalfa in feed value. Cutting and baling vetch can be difficult. Oats or barley or annual grasses mixed with vetch make haying operations much easier. Two to three tons of hay to the acre can be harvested early, and what is left will be readily grazed by livestock. Seed can be harvested easily with an ordinary grain harvester.

Several forms of wildlife utilize Lana vetch. Deer eat vetch mainly during the summer and fall months when other feed is sparse and of poor quality. This is a critical period in the life cycle of spring-born fawns. Quail, doves, and other birds eat large quantities of the seed.

Controlling weedy plants by overtopping and smothering them is another beneficial use of the multiple-purpose plant. — A. LLOYD FRANCIS, JR., district conservationist, SCS, Willows, Calif.

Nebraska

From homestead to showplace

Ponies, peafowl, and nature's wild creatures share a pond and other comforts on a farm managed by the head of the Nebraska National Guard.

Adjutant General Lyle A. Welch and his wife have spent many hours and dollars to ensure adequate food, cover, and water for all denizens of their Melody Meadows Pony Farm near Milford. They have literally had their hands in much of the conservation work done on their 80-acre farm (part of a half-section settled by the General's grandfather in 1880).

Before the couple moved there from Lincoln in 1959, the creation of a conservation showplace had already begun. Terraces and grassed waterways were installed in 1956 with the help of the Seward County Soil and Water Conservation District. The next year a pond was added and stocked "mostly for the grandchildren." General Welch and his wife dig out weeds with a spade rather than risk getting chemicals into the pond (no herbicides are used on the farm).

After the pond was completed and before a new home was built to replace the original house on the Welch homestead, the General asked SCS District Conservationist Vince Jacobson to help him tackle the next phase of his campaign.

They set aside an acre of class III land near the pond and ordered planting stock through the Nebraska Game and Parks Commission. The Welches set every one of the thousand or more trees and shrubs by hand in contoured rows.

Multiflora rose, bear berry, Nanking cherry, Russian olive, honeysuckle, and cotoneaster furnish cover for game. The Welches also planted a pine windbreak to trap snow, break the force of the wind, and attract more wildlife.

"We get closer to our Maker out here on the farm," Mrs. Welch says. Anyone who views the new beauty and order she and her husband have brought to the old family homestead would agree.—RAYMOND C. KUBIE, assistant area conserationist, SCS, Lincoln, Nebr.

Pennsylvania

Room to rent for ducks

Manmade marshes in Union County, Pa., are becoming popular rest stops for waterfowl in the Atlantic Flyway. The marshes and nearby food plots are proving to be ideal areas for nesting and feeding. Many ducks like the marshes so much they spend summer in the area—they stop in the spring to raise their young and stay until fall.

Maker of the new homes for wild-life is Land Manager Don Watson of the Pennsylvania Game Commission who cares for 3,000 acres of state game lands (formerly farmland used by the U.S. Government during World War II). Six years ago duck hunting was unheard of on this area, Watson said. Now, opening day attracts scores of hunters, and the take is good. Spring and fall population of blacks and mallards there runs between 300 to 400.

Watson coaxes the wily birds off the flyways and keeps them through hunting season by providing them with the right kind of habitat—including water impoundments to create large shallow areas of water. The ponds must be engineered, he says, so that the water level can be drawn down in the spring and raised in the fall. Duck food is planted in the drawn-down area, and as it matures the ponds are refilled so the ducks can harvest the food.

There are 60 acres of shallow water scattered throughout the area. Another 100 acres of water is included in the conservation plan for the 3,000 acres developed with the help of the Soil Conservation Service.

Watson works closely with SCS in planning and establishing the marshes and food plots. They are turning this former farmland into a new use—more ducks and better hunting for Pennsylvania's growing army of nimrods.—CHARLES SLATON, public information officer, SCS, Harrisburg, Pa. ◆

Meetings . . .

Youth and environment are ASCD spotlights

"Dare to Care/Dare to Act" will be the theme of the 26th annual conference of the Association for Supervision and Curriculum Development March 6-10 in St. Louis, Mo. The theme expresses ASCD's commitment toward social justice, effective education for all, an ultimate in humanness, and development of awareness and skills to attain these goals.

One of the main topics to be discussed in "action laboratories" will be "The Education Environment: A Wasteland" involving population explosion, waste of natural resources, pollution, and waste of human potential. Other topics include "Drug Usage Among the New Youth," "Contemporary Youth Ideologies," "Racism," and "Value Conflicts Underlying Curriculum Development."

Special TV programs will present "The Mexican American in Public Education," "The American Indian in Public Education," and "A Student Forum on Educational Issues."

Important issues face Pulpwood group

The American Pulpwood Association's annual meeting will be March 29-31 in Atlanta, Ga. Plans are to discuss the most important issues facing the pulpwood industry during the coming year. Manufacturers of pulpwood logging equipment will bring forth the latest developments in their field.

NWF discusses environmental quality

The National Wildlife Federation at its 35th annual meeting March 5-7 in Portland, Oreg., plans to devote one full day to "Environmental Quality-Breakthrough or Breakdown?" Topics include: "The

Student Council on Pollution and Environment;" "Oregon's Environmental Concerns:" "Skylab-Monitoring in Space;" "Environmental Challenges of the Seventies;" "The Legal Approach to Environmental Problems;" and a summary.

Many current problems will be handled by subcommittees on environmental quality, forest resources, fisheries, minerals, natural area, public lands, soil conservation, water conservation, and wildlife.

NWF has scheduled a pre-meeting tour to Hood River, Columbia Gorge, and Multnomah Falls and a post-meeting tour to Hawaii.

Clean water week

Public Law 91-594, approved December 28, 1970, proclaims the first full calendar week in May of each year as "Clean Waters for America Week."

ASPO to highlight urban growth policy

The 37th annual conference of the American Society of Planning Officials will be held in New Orleans, La., March 27-April 1.

Major addresses and end-of-theconference colloquy will consider the goals, mechanics, and intergovernmental relations of urban growth policy. Several sessions and exhibits will focus on the issues of environmental quality.

Plans are for individual sessions to examine basic objectives and procedures for revenue sharing, population distribution, the 1970 Census. and transportation planning.

Environment heads AGC program

The Associated General Contractors of America will hold its 52d annual convention March 5-11 in San Diego, Calif.

Environment will be one of the major discussion topics. Others include: Building specifications, continuing education, equipment expense and tax, ethics and trade practices, industry advancement, research, and labor.

Dates and places

March 5-7, National Wildlife Federation, Portland, Oreg.

5-11, Associated General Contractors of America, San Diego, Calif. 6-10, Association for Supervision and

Curriculum Development, St. Louis, Mo. 7-8, The Wildlife Society, Portland, Oreg.

14-20, National Wildlife Week.

16-19, National Rivers and Harbors

Congress, Washington, D.C. 26-30, National Science Teachers Association, Washington, D.C.

27-Apr. 1, American Society of Planning Officials, New Orleans, La.

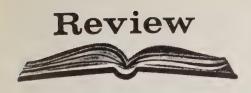
29-31, American Pulpwood Association, Atlanta, Ga.

13-14. Alaska Forest Fire Council symposium, Fairbanks, Alaska.

21-24, Urban Land Institute, Portland, Oreg. •

Making use of crop wastes

Agricultural Research Service scientists are continually searching for ways to use crop waste materials that ordinarily are just left in the field for residue. One result: A new process for obtaining oil from celery residue. The process, developed at the ARS Fruit and Vegetable Products Lab., Winter Haven, Fla., yields oil that has a better flavor and is more potent than oil extracted from celery seed or made synthetically. Celery leaves, tops, and outer ribs are heated to drive off 10 to 20 percent of their moisture, which carries with it the volatile celery oil. The vapors are trapped, and the oil is separated from the moisture. About 5 ounces of oil is obtained from a ton of raw material, but these 5 ounces are enough to flavor a ton of dehydrated celery. Celery is one of the Nation's top 10 vegetable crops with an annual farm value of \$60 million. From 10 to 15 tons of celery plant per acre is left in the field after harvest.



One-third of the Nation's Land. By the Public Land Law Review Commission. 1970. (Govt. Print. Off.). 342 pp., illus. \$4.50.

For longer than the 5 years it took to prepare it, the Public Land Law Review Commission's report to the President and the Congress will be the subject of study and center of debate for groups concerned with the Nation's land resources.

The study initiated in response to Public Law 88-606 provides perhaps the first complete inventory of federally owned lands and surely the most exhaustive collection of facts about them.

As the title proclaims, they embrace a third of the Nation's total land area: 755 million out of the 2.3 billion acres in the 50 states.

The 25-member commission headed by Representative Wayne N. Aspinall, served by a staff and an advisory council, contracted for research studies that resulted in manuscript reports on 33 individual subjects (*Soil Conservation*, Sept. 1968).

The resulting report distills from the research findings, public hearings, and staff work an informative description of the timber, range, mineral, water, fish and wildlife, agricultural, marine, and outdoor recreation resources of the Federal lands. It discharges well the commission's assignment to make "a comprehensive review of (public land) laws, and the rules and regulations thereunder" as well as "the policies and practices of the Federal agencies charged with administrative jurisdiction over (public) lands insofar as such policies relate to the retention, management, and disposition of those lands (in order) to determine whether and to what extent revisions thereof are necessary."

It presents 17 general policy recommendations regarding all public

lands and 137 specific recommendations pertaining to particular aspects (like planning future public land use) or segments (like timber resources) of the public lands.

In the months and years ahead, conservationists and concerned citizens will need to become familiar with this landmark document. There is no substitute for studying the original publication—B.O.O.

Introduction to the Study of Soils in Tropical and Subtropical Regions. By P. Buringh. 1970. 2d ed. Centre for Agricultural Publishing and Documentation. Wageningen, Netherlands. 99 pp. illus; paper. 15Dfl.

The book is short and readable for beginners. It gives brief summaries of some of the principal kinds of tropical and subtropical soils in some recognized systems of classification. The "agricultural" (farming) evaluations are largely based on original nutrient supply rather than response to management.

This edition corrects some errors of the earlier one. The author, however, fails to emphasize the nutrient cycle under tropical forests, which accounts for successful primitive shifting cultivation. Only a small part of the great literature on these soils is tapped.—Charles E. Kellogg, deputy administrator for soil surveys, SCS, Washington, D.C.

A Strategy for Plenty. By Food and Agriculture Organization of the United Nations. 1970. FAO, Paris (Distr. by UNIPUB, New York). 63 pp., illus. \$1.50.

An attractive little album (8 by 8 inches) presents a popular digest of FAO's Indicative World Plan for Agricultural Development, illustrated with handsome photos and colorful charts.

This booklet will appeal more to the casual reader than would the lengthy detailed report (Soil Conservation, Feb. 1971). It will serve a good purpose in carrying to the average citizen the important story of foreign agricultural development.—B.O.O.

New publications

Assistance Available From the Soil Conservation Service. 1970. USDA Agr. Inf. Bull. 345. 29 pp., illus. Outlines SCS's technical aid through conservation districts to individuals, groups, organizations, cities and towns, and county and state governments. Explains help available through small watershed and Resource Conservation and Development projects; the Great Plains Conservation Program; soil surveys; conservation needs inventory; water-resource activities and river basin investigations; and other activities.

Urban Renewal: One Tool Among Many. 1970. Report of the President's Task Force on Urban Renewal. 15 pp. Lists objectives: to enhance the efficiency of land use, improve the fiscal and economic conditions of the community, and decrease the threat of balkanization and polarization of American society. Makes recommendations on involvement of the Federal Government in urban renewal.

Air Pollutants Affecting the Performance of Domestic Animals, a Literature Review. By ROBERT J. LILLIE. 1970. USDA Agr. Hbk. 380. 109 pp. \$1. Reports on cattle, sheep, goats, swine, horses, chickens, turkeys, ducks, geese, pigeons, Japanese quail, dogs, cats, rabbits, and honey bees.

Glossary of Soil Science Terms. 1970. Soil Science Society of America, 677 South Segoe Road, Madison, Wis. 53711. 27 pp. \$1. Includes two appendices: Appendix I, Terminology in Clay Mineralogy, and Appendix II, Soil Classification.

Soil surveys

Virgin Islands of the United States. By Luis H. Rivera, Wayne D. Frederick, Cornelius Farris, Earl H. Jensen, Lyle Davis, Cecil D. Palmer, Lyle F. Jackson, and William E. Mc-Kinzie. 1970. 78 pp., illus.; maps 4 inches to the mile (1:15,840).

Lake County, Illinois. By John E. PASCHKE AND JOHN D. ALEXANDER. 1970. 82 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by L. J. Bushue, R. H. Herman, K. C. Hinkley, E. E. Kubalek, R. H. Newbury, J. E. Paschke, H. R. Sinclair, and P. S. Watters.

Shelby County, Tennessee. BY E. C. SEASE, R. L. FLOWERS, W. C. MANGRUM, AND R. K. MOORE. 1970. 53 pp., illus, maps 4 inches to the mile (1:15,840).

Shawnee County, Kansas. BY WALTER ABMEYER AND HOWARD V. CAMPBELL. 1970. 77 pp. illus.; maps 3.17 inches to the mile (1:20,000).

Recon...

Wheat, cotton, and feed grain land diverted from production may be used as wildlife habitat or wildlife food plots if the general public is given access for hunting, trapping, fishing, and hiking. This is part of a set-aside program established by the Agricultural Act of 1970. (To be eligible for Federal payments. farmers must set aside acreage determined by the Secretary of Agriculture). Under the Cropland Conversion and Greenspan long-term retirement programs continued by the Act, producers may be paid for permitting free public access to acreage devoted to approved wildlife practices.

Communications technology is the key to achieving improved environmental quality for future generations, according to Dr. Peter C. Goldmark, president of CBS Laboratories, Stamford, Conn. "People in smaller communities could live and work at great distances from each other," Goldmark says. Instead of piling all its men and machines in one metropolitan factory, a company could split operations geographically. **Employees** management at various locations would be linked by a broadband communications network. The same system could carry mail, educational and cultural programing, and entertainment to wall-to-wall home receiver screens. Goldmark's "rural society" concept is already beyond the pie-in-the-sky-stage. Connecticut and Georgia have plans for projects using highways of cables that will allow businesses to communicate by rapid, facsimile transmission, picturephones, and other devices.

Land use change projections . . .

"Though a land shortage is not imminent, some of the bastions of California's agriculture will have to make room for more people needing places to live and work . . ."-officials estimate that population will nearly double by the year 2000 (from 20 million to date to 38 million in the future). The land use picture, foreseen by researchers at the University of California at Davis (in cooperation with the Economic Research Service) looks like this: Land put to urban uses will increase from 2 million acres (1960) to 3.6 million by 1980 and 4.8 million by 2000. Through 1980, 30 percent of the increase will be on prime agricultural land; 40 percent, less productive; and the rest, unsuited to cultivation. So far, so good. By 2020, who knows?

... and objections

Some Illinois farmers have taken on a large power company in an effort to keep their class I land from becoming the bottom of a 7,000-acre cooling lake for a nuclear power plant. The trouble started right after the farmers helped defeat a county zoning plan that would have designated the land in question "agricultural." The company already has acquired almost 60 percent of the farmland in question. But the farmers say: "Today with the mood of the country concerned about protecting our environment and assuring an adequate food supply, we have a chance." They want to shift the lake site to a nearby less productive area.

Relationships between habitat and song bird population in an urbanizing area are being studied in the new town of Reston, Va. Preliminary research sponsored by the Virginia Cooperative Wildlife Research Unit and the Southeastern Forest Experiment Station is being carried out by a master's degree candidate from Virginia Polytechnic Institute. The study was set up in response to

residents' inquiries; Restonians wanted to encourage birds other than starlings and sparrows who move in as the area develops. Vernon Walker, director of Reston's Nature Center, thought that habitat variation might be a key to influencing the diversity of wildlife. Residents help the graduate student by reporting bird count results and data on backyard bird feeding stations.

Wanted: soil conservationist for 2-year assignment in rural Madagascar. The Peace Corps is expanding its dragnet for volunteers willing to take overseas assignments related to environmental quality. Developing nations are making more requests for experts to help deal with side effects of improved standards of living. Although in the past Peace Corps has placed groups of volunteers, the 10-year-old agency is seeking persons eligible for individual research or management positions. Ecologists, marine biologists, landscape architects, and park planners are a few of the professionals now in demand. Applicants for natural resource work file standard Peace Corps forms that are processed mainly through the Smithsonian Institution. Improved communications with American graduate students also are being channeled through the Smithsonian.

Catfish on every plate

"Catfish is very definitely an answer to the world's shortage of food. We need a protein species that can be grown in large densities and survive these densities. The catfish is among the few which have that characteristic. Carp and Talapi are other types of fish currently being used in Israel, the Philippines, and Japan. However, neither of these has the taste of catfish. (Catfish is more palatable than trout, according to the Bureau of Commercial Fisheries.) Catfish can very definitely contribute to providing protein to our starving people around the world."-Porter Briggs, executie secretary of the Catfish Farmers of America.

From the Administrator:



What it's worth to us

Land, water, and wildlife. All are closely related; all interact, so that to change one component of the trio is to change the other two as well.

No one questions the importance of land or water to human life. But to some people, the value of wildlife—its contribution to our lives in the 20th century—is more difficult to understand or appreciate or describe.

There is the pleasure that millions of Americans receive from hunting, fishing, or birdwatching.

There is the esthetic appreciation of a walk in the woods, a morning in the marshes, an hour observing wild things at play.
Wildlife has much the same social utility as art or music . . . the ability to surprise, delight, reveal.

There is the value of wildlife as a measure of what we are doing to our common environment. If we create conditions that are lethal to some wildlife species, we should take the warning that mistakes are being made—because man as well as wildlife may be in danger.

And finally, there is the value of wildlife as part of the "genetic pool" of our natural world. Exterminating a species or radically upsetting the ecological balance for others may have consequences that we cannot predict now.

Recently, the American people have become more concerned about the care and improvement of their entire natural environment, including wildlife. An aroused public has helped bring about new laws, new programs, new attitudes.

The Soil Conservation Service has always been concerned with the effect of its work on wildlife. We know that the majority of wildlife in this country today lives on, and from the products of, the Nation's farms and ranches and privately managed ponds and marshland. Soil and water conservation work over three decades has helped assure the necessary food, water, and cover.

And action taken specifically to aid wildlife has made thousands of farms and ranches even better wildlife producers. Fish and wildlife measures are an important part of the action in watershed projects and Resource Conservation and Development projects.

Helping landowners and communities locate areas best suited for wildlife... adapting cropland practices to the job of creating ideal soil and water conditions for wildlife... selecting plants to suit the special needs of wildlife—all are part of the "kit bag" of tools used by SCS working through 3,000 local conservation districts.

SCS personnel throughout the country have a direct interest and involvement in the quantity and quality of the Nation's wildlife resources. They can and should be alert to changes in the use of land, water, or vegetation that may affect wildlife species. They should have close working relationships with state fish and game agencies and other authorities so that facts about those changes can be given to them.

We continue to seek further opportunity to improve man's environment in meaningful ways. Positive actions of thousands of SCS employees and conservation district leaders are helping increase wildlife and the chance for people to enjoy it.

Kenneth E. Grant

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Wind cave at its best

The National Park Service, cooperating with Custer County Conservation District, has developed a conservation plan on the 28,059-acre Wind Cave National Park in the Black Hills of South Dakota.

Its purpose?—to help keep the park's soil, plant, and animal resources a showcase of good management for the million or more visitors each year.

Wind Cave National Park, created in January 1903, was the seventh national park in the United States. Visitors to the park see unspoiled rolling prairies and foothills with bison, pronghorn antelope, prairie dogs, and other wild-life in their natural habitat, essentially as seen by our pioneers crossing the Great Plains.

Wind Cave is the predominant geologic feature, with 10 miles of passages of crystalline mineral deposits, including boxwork and frosting.

SCS conservationists helped inventory range and woodland conditions, made a soil survey, and recommended conservation practices. Forty-four soil mapping units were grouped into six range sites and three woodland sites.

Among practices planned are: Wildlife habitat management, proper

grazing use (bison), critical area planting (disturbed areas), noxious weed control, wildlife watering facilities, and recreation area improvements.

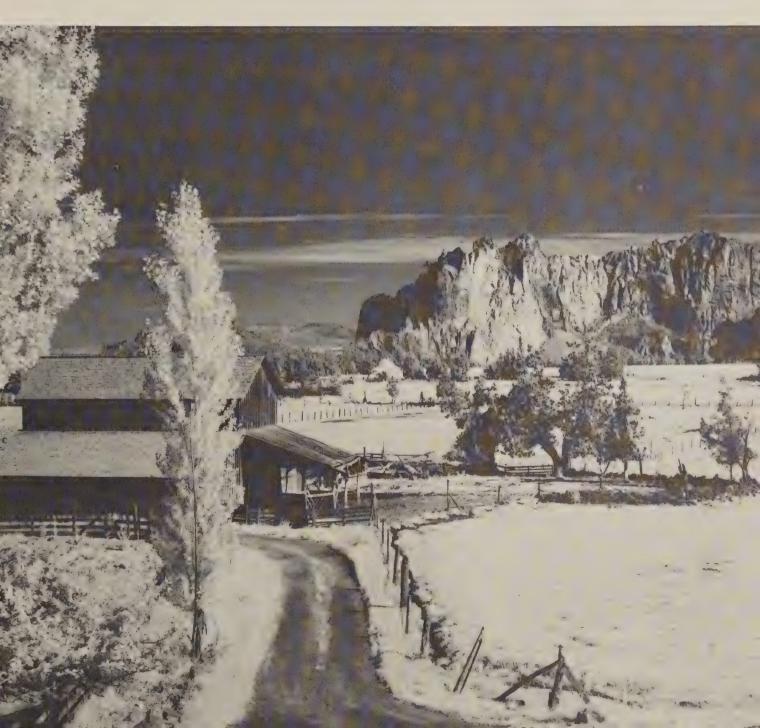
Park officials will keep a close eye on the key browse plants of deer, antelope, and elk. Sixteen photo points have been set up, where selected browse plants will be systematically photographed against a gridded backdrop to measure degree of use and vigor.

Park officials are favorably impressed with their cooperative experience in conservation planning at Wind Cave.—John B. Farley, biologist, SCS, Huron, S. Dak.





U.S. Department of Agriculture
Soil Conservation Service



It's a nice place to visit and I would like to live there . . .

Rural America has a lot of room and a lot of natural resources that can make life rewarding for more people. Making sure life is better is the aim of conservation action spelled out in this issue.

The lead article discusses pioneering conservation work in Coon Valley, Wis., and its long-term effect on the area. Elsewhere:

- . In Idaho, milling of waste timber gives new economic spark to a small town;
- . In Louisiana, erosion control saves an airport;
- . In Utah, city youngsters learn the delight of a real farm:
- . In Tennessee, a farm family improves the land instead of moving;
- . In Texas, sprawling university lands are given better care for better grazing;
- . In New Mexico, Indian drum-making turns from hobby to business;
- . In Florida, a farm becomes a new community;
- . In Oklahoma, a watershed lake becomes a recreation complex;
- . In Wisconsin, landowners create new waterfowl habitat to bring back the birds; and
- . In Hawaii, what the sugarcane mill doesn't want helps grow crops on lava.

COVER: An Oregon ranch, where the horizon is broken by a real cliff instead of the next apartment building.

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Coon Valley proves the claim

Modern soil and water conservation practices claim a number of birthplaces. One of them lies in western Wisconsin. Rich in history and beauty, the valley of Coon Creek and the people who live in it have seen the full cycle of resource development to disaster and back again.

Torger Gaardhammer came home to Coon Valley from the Civil War with a new idea. Down south he had seen farmers plowing furrows up-and-downhills, letting the rain wash out gullies deep enough to turn cattle. They replaced the need for

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Mr. and Mrs. Adolph Lee, early cooperators in the Coon Creek Demonstration Project.

fences. He tried it, and it worked . . . too well. He had to give up the idea because there was no way to stop the cuts from getting deeper and deeper and absorbing the entire farm.

Wheat had been the main crop in Coon Valley, and it had partly protected the land from erosion. But the shift to cattle brought a need for more pasture—and the clearing of steep slopes and grazing of woodlands. Even those who did not use Torger's idea had gullies because the water rushed down the hills too fast to be absorbed. By the early 1930's gullies, floods, and droughts were driving people from the farms.

"One time back in the late twenties we had three floods in 1 week," recalls Adolph Lee, one of the few valley pioneers still living on his farm near the town of Coon Valley. When he had moved there as a boy in 1898, he could jump Coon Creek wherever he chose.

In 1933, the Federal Government decided to help farmers solve soil and water problems. Hugh Hammond Bennett, world renowned "Father of Soil Conservation," asked R. H. Davis, superintendent of the La Crosse Erosion Experiment Station, to help him pick a site for a

conservation demonstration project. Davis, Noble Clark, E. R. Jones, and Aldo Leopold of the University of Wisconsin College of Agriculture proposed Coon Valley, and Bennett designated it "Project No. 1"—the first in the Nation. Since the area was marked out on a watershed boundary, it also became the Nation's first small watershed project—long before the Small Watersheds Act of 1954 was passed. Orville Hays, who succeeded Davis, also was an early architect of the project.

In 1934 a Civilian Conservation Corps (CCC) Camp moved into Coon Valley to help landowners apply conservation practices. They built masonry gully-control structures, planted trees, improved woods and pastures, and laid out contour strips of row crops with grass between. Farmers were encouraged to plow across the slope with strips instead of up and down—an early example of contour stripcropping as was being done in nearby Mormon Coulee. Although CCC labor helped, it was still mostly a job for each landowner.

The 92,000-acre watershed was divided into four units with a planner assigned to each: Herb Flueck,

recently retired as Minnesota state conservationist; Marvin Schweers, who became state conservationist for Wisconsin; John Bollinger, who later farmed near Cochrane, Wis.; and Joe Schaenzer, who was with Rural Electrification Administration in Washington, D.C.

Adolph Lee was among the first to sign up for help. I. N. Knutson, Coon Valley banker and friend, encouraged him and many others to get into the program. Ben Einer, farmer and rural mail carrier, spread the word all along his route. Of the 800 farmers in the valley, more than half became cooperators.

Lessons learned here helped establish conservation practices across the Nation and around the world. At the 20th anniversary celebration in Coon Valley in 1955, Bennett, then retired as chief of SCS, said, "The success of Coon Valley rang bells around the world." The State Highway Commissioner unveiled a historical marker that day, proclaiming the valley "The Nation's First Watershed." Other oldtimers from across the Nation joined Bennett for a second look at the project, visiting 75 of the original farms that had received assistance. Almost all were continuing conservation practices.

Yet occasional flooding still occurred. In 1958 Coon Valley leaders asked SCS for another push toward flood prevention through Public Law 566, and a small watershed project was approved. Fourteen floodwater-detention structures, the last completed on June 30, 1966, now nestle in the upper reaches of the valley. Flood-free at last, many valley farmers have been able to use bottom lands for high value crops and tie down the hillsides with trees and grass. Here it was that conservationists learned it takes both upstream watershed treatment and floodwater dams to do the job.

A sawmill, water-powered until about 3 years ago, operates in the valley, using logs grown under management begun in the 1930's. Some of the original terraces show on

cropland fields, but many have been replaced with new systems of contour stripcropping fashioned during the project days. Some have been converted to diversions, oversized terraces carrying more water. More than 15 miles of new diversions were built during the Public Law 566 project days. Early planners urged dairymen to fence the woods and keep cattle out so new growth of trees and grass could protect the land; the practice is still followed. Foresters come here to study results of 35 years of conservation management.

Biologists recommended fencing streambanks so grass and shrubs would grow and make homes for wildlife. Later the Wisconsin Department of Natural Resources (formerly the Wisconsin Conservation Department) entered into contracts with the landowers to protect these areas.

Since floods have been controlled, trout fishing in Coon Creek is good again. Deer, almost extinct in 1930, are also plentiful. Hunters shot more than 600 last year. Ruffed grouse are in supply, although pheasants seem to be scarce.

Abandoned farms are scarce. Second and third generation farmers, many Norwegians along with Germans and Bohemians, are still there. Adolph Lee's son Burton now farms the land his father improved during the conservation-demonstration project days. When the land changes hands, it is usually bought by a neighbor to enlarge his holdings or is sold to new families attracted by the security they find in owning land. A ski slope along one of the bluffs attracts many winter sports

enthusiasts, and a new summer home or two can be seen in the coulees.

Conservation-demonstration projects are no more. In 1938 "Big Hugh" Bennett helped shape legislation setting up state machinery to organize local soil and water conservation districts. Every state eventually passed a law keeping the conservation job under local leadership and, at the same time, spreading conservation throughout the country. There are now more than 3,000 of these districts in the 50 states and Caribbean Area. Each urges landowners to apply conservation measures, many of which were tried and proved in Coon Valley years ago.—John M. Cross AND MILLARD C. DAVIS, information specialists, SCS, Lincoln, Nebr., and Madison, Wis. ♦

Contour stripcropping in the Vernon District.



New ideas revive a town and an industry

By Gerald W. Yeoumans
District conservationist, SCS, St. Maries, Idaho

Six years ago, Calder, Idaho, a small town nestled in the St. Joe River valley, was scenic but dying. Today, it is scenic and growing. What made the difference?—people who care for their community and believe in resource improvement.

Calder, like many other small communities in the Idaho-Washington Resource Conservation and Development Project, grew up with the timber industry, flourished a while, then subsided as the virgin timber was cut and the industry went farther and farther back into the mountains for its supply. In 1965, only 85 people were left in the town. Employment in the timber industry was seasonal, and there were no jobs at all for women, young people, or

those physically unable to stand the rigors of heavy logging.

Calder's new look can be traced to Bill and Bernice Jones. Moving to town in 1965 to purchase the general store, they saw an opportunity in expanding a small local cedar products mill. In 1966 they bought the mill and merged with Idaho Cedar Sales Company at Troy.

The next step was to mechanize the plant so that it could efficiently produce cedar shingles, stakes, rails, posts, and pickets. Cooperation with a local tractor company in Troy led to design and construction of specialized machinery. Production jumped dramatically, picket production doubled, and posts, rails, and other products increased fivefold.

Employment at the Calder plant went from two to 10-18 people a shift. Extra shifts soon were needed to fill the demands created through marketing efforts.

Now there is employment opportunity for young and old. People who for some reason cannot work in the mill can do piece work at home. Idaho Cedar Company will deliver unfinished cedar bolts and purchase back the handmade pickets or posts. Women work in the mill, primarily in the picket section where lightweight work is available. During winter, when other logging jobs are shut down, extra shifts are put on to take advantage of the excess labor.

Cedar logs used in the mill are all "cull" logs that only 6 years ago were left to rot in the woods. Logs with as little as 3 inches of solid wood shell around a rotten center are usable. Thousands of dollars and days of employment have resulted from making a fire hazard into a valuable resource.

The effect on the community was dramatic too. Population jumped from 85 to 225. Eleven new houses were built. Every house in town now has a health department-approved septic tank and drainfield only one acceptable system existed in 1965. There is a new community water supply—put in with a lot of volunteer labor by the townspeople to keep costs as low as possible. Four fire hydrants now provide Calder's first fire protection. The "one-room" schoolhouse has been expanded to a "two-room" schoolhouse to handle the first six grades of elementary education.

Calder isn't finished yet. RC&D cost-sharing funds will be used to build four structures on Bear Creek to protect the town from almost annual flooding. What next? Hard to say, but one thing is certain: The enthusiasm of the people of this little town will lead to something.



With special equipment these cull cedar logs now can be used to make many specialty products.

Trailblazer 4 keeps planes flying

By Paul A. Miletello
District conservationist, SCS, Minden, La.

Planes are going down the runway at Minden Airport, Louisiana, instead of taxpayers' money going down the drain, thanks to the Trailblazer 4 Resource Conservation and Development Project.

Soil erosion threatened to destroy the \$140,000 runway extension in early 1969. When the Airport Authority could not find enough funds for repairs, Warren Dietrich, its chairman, went to the RC&D Project sponsors for assistance. They turned to the Dorcheat Soil and Water Conservation District in Webster Parish and the Soil Conservation Service.

"The SCS not only agreed to take on the job," said Dietrich, "but city officials were informed that through the RC&D Project, SCS could share up to one-half the cost of stopping erosion on the airport."

The eroded areas were filled and smoothed, the slopes restored to their original condition, and several species of grasses planted to hold the soil in place. Straw mulch was ap-



plied to all seeded areas until the grass took hold. Drains at the ends of the slopes were lined with burlap, and two structures were put in to handle water runoff from the slopes. The erosion-control work now is completed.

Students of the Evergreen Presbyterian Vocational School helped install the two water-control structures and stabilize the slopes. The city of Minden and the Louisiana Department of Public Works paid the \$5,500 local share of costs for the two structures and shaping and seeding.

"We believe that Minden now has one of the finest airports in a city our size," says Chairman Dietrich.
"The efforts of the Trailblazer 4
RC&D Project, SCS, and the Dorcheat District have helped assure
our airport a longer life." ◆

Minden Mayor Tom Colton (above left) discusses the airport's conservation plans with Claude O. West, Minden Airport Authority member, and Carl V. Thompson, SCS soil conservationist. Below left, boys from the Evergreen Presbyterian Vocational School apply mulch to a slope. Below right, the author checks seedbed preparation on one of the airport's cutback areas.





The wonder of a farm

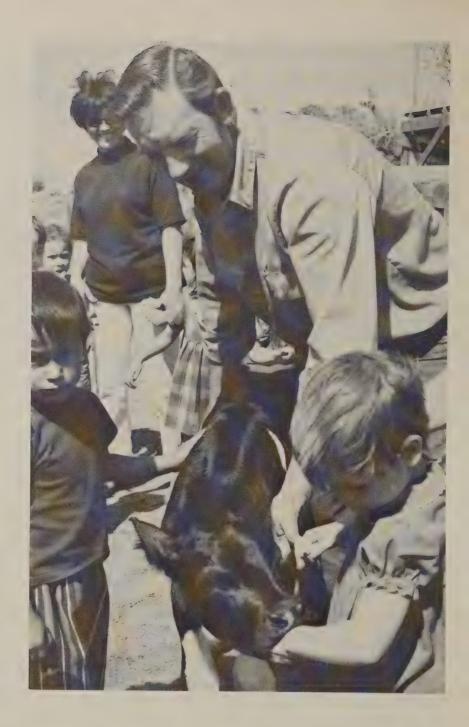
By Earl Spendlove District conservationist, Layton, Utah

Bright-eyed city youngsters from elementary and Headstart Program schools in Bountiful and Salt Lake City, Utah, have been coming to the Tom Williams farm for several years. They see, hear, touch, and smell the wonders of a farm. Farm animals are as much a novelty to these children as animals in a zoo, and farm equipment is as strange as a satellite.

The 400-acre dairy farm in Centerville, some 10 miles north of Salt Lake City, is owned and operated by Williams and his sons, Emery and Thomas, Jr. They milk 70 cows and maintain a herd of 80 calves, dry cows, heifers, and steers. The cattle, horses, rabbits, pigs, chickens—and a litter of kittens living between the bales of a straw stack— are a source of amusement and amazement to the youngsters from the city streets.

For some, seeing the strange animals is a frightening experience. A pen full of squealing pigs, or a horse or cow towering above them brings fear to their hearts. But the teachers usually can build the childrens' courage enough to reach out and touch the more gentle animals.

The children—usually ages 5 to



8—are full of questions about everything they encounter; their natural curiosity has not been stifled by adults who say, "Don't ask such silly questions." And on the Williams farm all questions, silly or not, are answered too.

According to Williams, not all the questions are asked by the students.

A number of parents and volunteers come with each group to help supervise the children. Many of them have never been on a farm before, and their questions show their interest in farm life.

Williams, named Davis County's outstanding farmer in 1967, has been a supervisor of the Davis Soil



"That baby cow loves me!" says a Headstart visitor (left), as Emory Williams holds the calf. Children hold on to the kittens (above) with Tom Williams.

Conservation District since its organization in 1952. With him, soil and water conservation is a way of life. He has leveled land, installed drains, and piped irrigation water to the head of the fields. His farm is arranged so that drainage and runoff water from the upper fields irrigates the land below. Crops are rotated, and full use is made of commercial fertilizer and barnyard manure.

Farming is a full-time job for Williams and his sons, but at least one of them manages to take time out to show the youngsters around. They feel everyone should know where his food comes from and realize the importance of making the best use of our soil and water.

A farm family that stayed

Mr. and Mrs. Luther Carter, a rural Tennessee farm couple, with children to raise, thought about migrating to the city. They heard from friends and neighbors who did move that city life was not all that good. So they decided they would stick—even before they had land of their own. They saved their earnings from cotton-picking and vegetable harvesting until they could make a down-payment on a 63-acre farm in 1954.

"It seemed like it always took all the money we could make to send the children to school," Carter recalls, "and the soil on the farm was so eroded and poor that I rented extra land to try to make a little more money."

Each year the monthly payments were harder to meet, and Carter had to rent more and more land. All eight children, however, were graduated from high school, and two completed junior college in Memphis, thanks to the dedication and persistence of their parents.

The breakthrough came in 1965. Carter was accepted in a farm-management class organized for lowincome farmers under the Manpower Training Act and sponsored by the Tennessee Department of Employment Security. Each trainee worked out a conservation plan for his farm with the help of the Soil Conservation Service. When Carter learned that his farm had soils as good as, if not better than, those on some of the land he rented, he decided to spend more time improving his own farm and less working on rented land. Each year he calls on the author to help him install practices.

Mrs. Carter actively supports her husband in his conservation work. "We need a new washing machine," Mrs. Carter says, "but it seems that

we have to have a pond one year, fencing the next, and so on. So for 3 years I have done my washing by hand."

Now the eroded farm is healed with grass and trees. A scenic farm pond on a formerly gullied area has assured plenty of water for livestock and fishing. Where brush and briers once grew, cattle graze on improved pasture. The cropland is protected by diversion terraces.

In 1968 the Carters borrowed money through the Farmers Home Administration for a house to replace their old asphalt-shingle-sided dwelling. The new house stands on a grassy knoll. Electricity heats and cools the house, powers the kitchen, and pumps water. The sale of crops pays for the improvements on the farm. Many things still need to be done on the farm. But the Carters are happier than they have ever been.

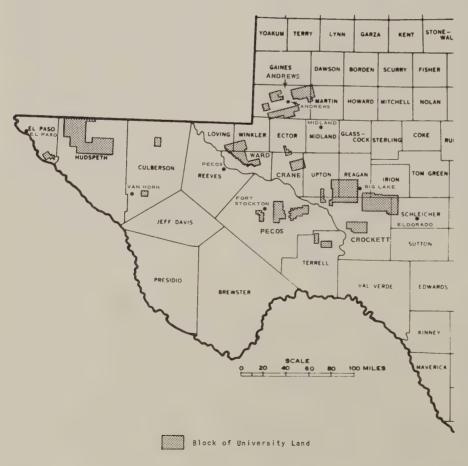
"I took some of my grandchildren fishing in the pond a few days ago and we are catching some that weigh 3 and 4 pounds," Mrs. Carter said.

"The remembrances of the hardships of the past make us doubly appreciate our advantages today," Carter said. "And we are real proud that we decided to stay on the farm."

—Joe Boswell, district conservationist, SCS, Trenton, Tenn.

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Two million acres of grass



Getting conservation applied to a wide expanse of privately operated public land can be a problem.

In Texas, a new no-nonsense conservation policy adopted by the University of Texas system is helping. The university handles 2.1 million acres of land set aside for higher education by the Texas Legislature nearly 100 years ago.

"The grass cover on our land has steadily deteriorated," Billy Carr, land agent and oil field supervisor for the university, said. "I happen to believe, however, that the time has come to start it back on the road to improvement; that's exactly what we have set out to do."

The land sprawls over 19 arid west Texas counties. Its 5,700 oil and gas wells have pumped nearly \$600 million into a permanent fund. Invested by the university, the fund and the mineral resources have been managed well; but less careful grazing management and periodic droughts have gradually reduced the choice grasses once native to the area.

"We lease surface rights to 136 ranchers, or lessees," Carr said. "About 70 percent of these have tried to do at least a fair job of grassland management. We've always had about 30 percent, however, who were not taking good care of the land. And most of the others are not doing as good a job as we would have liked.

"To the layman, it might seem like a simple thing for us to require our lessees to take better care of the land," Carr said. "But it's not that simple unless you have a positive, well-planned program and someone to help carry it out."

Carr said that tracts given the university were areas that had not been homesteaded; a million acres was set aside in 1873 and in 1883. Early settlers took the land with creeks, springs, and watering holes, so the rancher who leases the university land has to provide livestock water and make other improvements at his own expense. And he still has to pay a competitive price for a



Land Agent Billy Carr (left), Ratliff, and SCS District Conservationist Bertsch discuss grassland management on the 50-section ranch Ratliff leases from the university system.

lease he may lose in a few years.

"With the help of the Soil Conservation Service and 11 soil and water conservation districts, we have figured out a way to solve our grassland-management problems," Carr said. "We started our program last year and it really looks promising."

The university's new conservation policy works like this:

As each long-term lease expires, the prospective lessee is told to contact the nearest SCS office for help in working out a complete conservation plan for the university land. An SCS conservationist and the rancher go over the land to determine the treatment it needs. The rancher selects the combination of measures he plans to install.

Next, the rancher and SCS man meet with Carr to discuss the conservation plan in detail. If Carr agrees that the plan meets the needs of the land and that it will result in improvement of university land, he approves it. Then the lessee has to agree to carry out the plan as a condition of his lease.

"In 1969, we made a major change in the way we handled surface damage payments," Carr pointed out. "Up until last year, oil and pipeline companies paid the lessee damages for oil, gas, and pipeline operations. Now we require that this money be sent to us. We keep it in escrow for the lessee and allow him to spend it for soil and water conservation work or for other improvements. This change wasn't very popular with our lessees at first, but it seems like the fairest way for us to help get this soil and water conservation work done."

Carr is requiring all lessees to plan and carry out at least two grassland-improvement practices. First, all the land must be given periodic rest from grazing. Usually, onethird of a lessee's unit is rested at least 3 months each growing season. The principle of proper grazing use must also be applied. Other commonly used practices include brush control, cross-fencing for better grazing management, and water developments for improved grazing distribution.

Duane Ratliff of Andrews is typical of the new style of conservationists who lease university lands. When his old lease expired in mid-1970, he enlisted the help of SCS District Conservationist Walter Bertsch in conservation planning on Ratliff's 50-section lease.

Under the plan, Ratliff has controlled 600 acres of moisture-robbing brush that had invaded one of the university's pastures. He also has piped water to a dry corner to aid grazing distribution. And he is resting one-third of the ranch every year.

"This seems to me to be a sound way to take care of university lands," Ratliff said when asked about the new conservation policy. "And we both gain by it. I make more money when I take good care of the grass, and the university makes more money when the lease value of the land increases."

Wildlife, scenic areas, and historical sites also get attention under the new policy. SCS helps Carr inventory and evaluate these resources and consider them in conservation planning.

Control and management of the University of Texas lands is vested in the university's Board of Regents. Board member Frank Ikard is chairman of the Land Investment Committee. Carr credits Ikard and Floyd O. Shelton, deputy vice chancellor for Investments, Trusts, and Lands, for helping get the new soil and water conservation policy established.

But Carr says it's the SCS technical help in planning and followup that make the new policy work on a day-to-day basis.—Dale D. Allen, public information officer, SCS, Temple, Tex.

The drum trees

By Cary Hull

Woodland conservationist, SCS, Albuquerque, N. Mex.



The mellow beat of Indian drums has been heard before in New Mexico's Northern Mountains, but this rhythmic thump, thump, may now be heard from Boston to Seattle and from Texas to Alaska.

Bob Brooks, who formerly made drums as a hobby, now is owner of the Taos Drum Company and makes drums for the commercial market. He employs from four to 12 Indians to help in logging, bookkeeping, hand painting, and filling orders. He has an annual payroll of approximately \$20,000 and spends about \$5,000 for equipment and supplies in the community. He plans to expand and eventually may employ 20 people and have an annual payroll of more than \$80,000.

The Northern Rio Grande Resource Conservation and Development Project has helped him solve technical problems in gathering and curing the logs used and find markets for wood previously discarded as waste. Assistance to local sponsors of the RC&D Project is given by several USDA agencies, under the leadership of SCS.

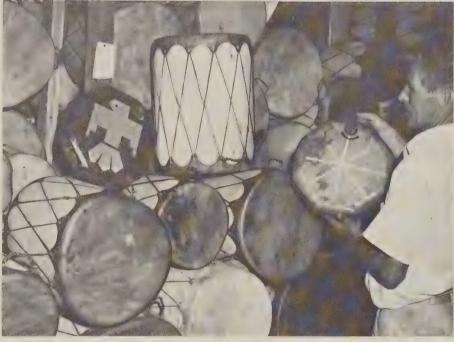
How are his drums made? Aspen from the nearby mountains is used for the shell of smaller drums. Blocks of aspen wood are peeled of all bark and hollowed out until a shell about 1 inch thick remains. After the shell is trimmed so it will sit level, it dries in the air for 1 to 6 months. Then, the shells are sanded and covered with cowhide. The drum heads are scalloped and secured to the shell with rawhide lac-

An aspen becomes a drum: Felled trees are cut into lengths (left), bark is trimmed off (upper right), center is cut and chipped out, cowhide heads and laces are added. Bob Brooks displays the finished product.









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ing. In a few days the heads are dry and the tom-tom is complete. Some are then hand-painted.

Big drums are another story. Brooks is proud that "We produce the largest Indian drums in history." But he's the first to admit that large drums are a lot of work.

Douglas fir is preferred for the shell of large drums because it is strong and has little pitch. Logging crews are always looking for large fir trees, but they are difficult to find since the area has been logged several times.

One tree found 19 miles from town was reported to be the largest one cut in the area since 1905. Loggers probably had passed it by because it had a forked top and might have a rotten core. Drum company loggers had to use an old

hand-drawn crosscut saw to fell the tree — power saws were not long enough for the 6-foot cut. The tree was solid to the core, and 17 blocks suitable for large drums were cut from it. Sawlogs obtained above the fork were sold to a local sawmill.

Work began on the big drums soon after the Douglas fir blocks were delivered. The 6-inch-thick bark was chopped off and the centers sawed and chipped out until only a ³/₄-inch shell remained. Metal bands were then tightened around the drums to minimize cracking and checking during the drying period. After this, they were processed similar to the smaller drums. The largest block made a finished drum 54 inches in diameter.

Brooks believes in using all the resources available to him. Long shav-

ings made by the chain saw while cutting out center cores are used as packing material to protect drums during shipment. Larger pieces from fir cores make good fireplace wood. Sander dust is mixed with glue to make reinforcing material. He now faces the challenge of locating an outlet for the aspen cores.

Indians have been making drums for more than 400 years in New Mexico, but they have never seen authentic drums used in such innovative fashion—for coffee tables, lamps, stools, end tables, clocks, and other decorative pieces. School organizations, drum and bugle corps, cheerleaders, collectors, musical and dance groups, and Boy Scouts have found the tom-tom useful in their work too. From old beginnings come many new ideas.

The bird business

A bird dog points, a quail flies, and a hunter shoots—a common chain reaction on the Lake Clopton Shooting Resort in Ellis County, Tex.

Pete Clopton and his wife Katherine are cooperators with the Ellis-Prairie Soil and Water Conservation District. They got into the shooting preserve business almost by accident. Clopton was born and raised on the 638-acre farm he operates. Before 1955, the whole acreage was devoted to cotton, alfalfa, small grain, and cattle.

In 1956, a dam was built across

one of the main creeks on the farm, creating 45-acre Lake Clopton. The lake was stocked with bass, bluegill, and channel catfish, and fishing permits were sold to the public.

The interest shown in Lake Clopton by area sportsmen led the Cloptons in 1963 to start a shooting preserve of their own. The Soil Conservation Service provided technical help, particularly in developing vegetative cover. The Cloptons then bought their first laying stock of bobwhite quail. Although there is still fishing, the birds have taken most of Pete's time and acreage.

Today the Lake Clopton Hunting Resort is complete; it has its own layers, incubators, raising area, and flight pens for aging and exercising the birds, facilities to board and exercise 50 bird dogs throughout the year, guide service, seven hunting areas—and, of course, Lake Clopton itself. The Cloptons raised 12,000 bob white, 800 pheasants, and 1,200 chukar in 1969.

They admit the business is not easy. During the October-through-March shooting preserve season, theirs is a daylight-to-dark job, with up to seven parties hunting at a time. In off-season months, birds must be raised and tended. One compensation comes from the people they meet. Pete Clopton says, "Ninetynine percent of the hunters are the nicest people you'll ever know."—W. L. WEDEL, area engineer, SCS, Corsicana, Tex.



Up to 15,000 quail are produced in these pens each year.

Farm-for-sale ad changes a county

By John T. Barnes

RC&D Project coordinator, SCS, Bonifay, Fla.

A small classified advertisement 10 years ago in the London Times triggered a chain of events that has helped reverse migration from Holmes County, Fla. It also focused attention on an area virtually untouched by the recreation, tourism, and industrial forces that have affected the rest of the state.

C. L. Walker, an accountant in Billingsherst, Sussex, England, read the "farm for sale" ad Canadian owner Frank Joyce had placed in the newspaper. Walker made a quick flight to visit the farm, 6 miles northwest of Bonifay. He liked what he saw and bought it and adjoining land—800 acres in all.

The land is largely rolling hills and valleys. Working through the Holmes Creek Soil and Water Conservation District, the Soil Conservation Service helped Walker plan soil and water conservation practices for the property.

Walker built two lakes in 1963, one a shallow 5-acre lake and the other 35 acres and 19 feet deep near the dam. SCS engineers designed the lakes to use a draw or "saddle" across one of the hills as a natural

spillway, eliminating the need for a manmade spillway at the dams. A canal large enough to accommodate small boats connects the two bodies of water, so one spillway serves both lakes. The lakes were stocked with bass, bream, and channel catfish by the Florida Game and Fresh Water Fish Commission and the U.S. Fish and Wildlife Service.

"I was delighted with the assistance given me by the various agencies," Walker said. "There is nothing in the United Kingdom comparable to the soil conservation district-Soil Conservation Service programs."

Walker's aim was to develop a place for people to live where the expression, "quality of living," would really mean something. About 1,000 tree-shaded homesites have been marked, and 25 beautiful new homes already are in the woods surrounded by dogwood that covers the slopes overlooking the lakes.

The beauty of the area also has

New home, pool, and golf course at Dogwood Lakes Estates.

led to recreational development. Newcomers and old residents formed the nonprofit Dogwood Lakes Recreational Organization to plan, finance, and build facilities. The 300-member group obtained a Farmers Home Administration loan, bought 150 acres of Walker's scenic hills, and constructed a community clubhouse, a 100-acre golf course, and a swimming pool.

"Development of west Florida is bound to happen," Walker says, "because of the area's climate, beauty, water supply, and other assets. I foresee it becoming a year-round resort region second to none in the country."







A lake and then some

"I guess our lake was the first one of its kind built in the Nation," said businessman and civic worker George A. Brown. The sparkling blue 23-acre lake a few miles north of Lindsay, Okla., looks like any other scenic lake. It has a dam, principal spillway, and a grassed emergency spillway. What sets the lake apart from hundreds of others along the Washita River Basin? the paved access roads, picnic tables, grills, outdoor lighting, and other recreational facilities.

The lake is one of the first constructed under Public Law 566 to have recreation as a primary pur-

"It's hard to believe that just a few short years ago this area was one of the most eroded upland farms in this part of the state," said Brown.

"We now have 50 to 75 people come out here every day to fish, picnic, hike, or just enjoy the beauty of this area." Some 4,000 people attended the fireworks display at the lake on July 4th.

The lake is one of 11 built in the Bear-Hybarger Creek Watershed

Project. Sixty-three other subwatersheds comprise the historic Washita Basin that has received intensive conservation treatment since 1944. Supervisors of the McClain County and Garvin soil and water conservation districts began planning conservation treatment in the project as early as 1957. They and other conservation leaders formed the Bear-Hybarger Watershed Association and raised \$30,000 in local funds to get the project underway.

The watershed work plan, completed by SCS in 1959, called for a single-purpose flood-prevention structure at the Lindsay site. About that time Brown and other members of the Golden Trend Golf Association came on the scene.

"We were just a bunch of golfers looking for a place to build a topnotch course," Brown said. "We had a chance to buy the land where the lake was planned and that's what we did.

"We found out that legislation had just been passed by the Congress that would permit SCS funds to be used in enlarging the lake and assisting with recreational facilities. We saw this as a real opportunity for our town and area."

For the new venture to qualify for Federal funds, the city of Lindsay became a cosponsor of the Bear-Hybarger Project. The city of 4,200 people now owns and operates the entire 185-acre recreational complex including the lake, adjoining area, and golf course.

Water storage and recreational facilities for site 3A were added to the work plan in 1963, increasing the surface of the lake from 15 to 23 acres and raising the cost from \$67,-000 to \$125,000. SCS paid a little over a third of the cost of the land, half of the cost of recreational facilities, and 95 percent of the construction cost of the lake. The golf association, city of Lindsay, and individual contributors paid the remainder.

"We met our local obligations without a tax levy or a bond issue, and the lake and adjoining area are open to the public without charge," Brown noted. The 9-hole golf course was constructed totally with local funds. Greens fees and annual dues are used to meet operating costs.

Brown said the outdoor recreational complex is a real drawing card when showing people what the Lindsay area has to offer. "Most company executives won't consider putting a plant in a town that doesn't have a golf course."

Oklahoma watershed projects have added water storage for recreational purposes to 12 structures, and projects in other states also have added recreation as a primary purpose. The people around Lindsay already know the value of including recreation in a watershed project; they get much enjoyment from the "first of its kind."—DAN F. CROOM, information specialist. SCS, Stillwater, Okla. ♦



A family enjoys picnicking and fishing at Lindsay Municipal Park.



The "Wetlanders"

By Laverne C. Stricker and George E. Framberger
Biologist and district conservationist, SCS, Madison and Oshkosh, Wis.

A ttracting waterfowl to the Lake Winnebago area in east-central Wisconsin is the task that landowners there, known as the "Wetlanders," have given themselves. Once the area was one of the finest waterfowl habitats in the state. It is still a large waterfowl-nesting area and an important migration stop, but not the way it used to be.

A sportsman now can spend many days afield without bagging a bird. But old timers like Elmer Radtke and Ben Zimmerman of Winneconne can remember when birds used to be so plentiful that market hunting was permitted and ducks were shipped in barrels to the cities for \$0.10 or \$0.25 apiece.

Over the years the quantity and the quality of the water resources have deteriorated. Draining and filling, pollutants such as sediment, introduction of carp, and destruction of aquatic plants all have contributed to a loss of habitat for waterfowl. Thousands of acres of bog marsh, prime duck habitat, have been lost by fluctuating water levels which caused the bog to break loose, float out into open water, and eventually sink to the bottom in one of the four lakes forming the Winnebago pool.

The "Wetlanders" sought help from the Winnebago Soil and Water Conservation District board, which gave a high priority to their objective of restoring the waterfowl habitat to what it had been earlier. Experts from the Wisconsin Department of Natural Resources, U.S. Fish and Wildlife Service, and Soil Conservation Service recommended actions that would improve the land for waterfowl.

One of the first and most important steps was protecting the marsh areas exposed to open water. Depositing quarry stone called riprap to prevent the loss of bog provided this protection. In addition, imigrating waterfowl need nesting areas and food, both near water. Members of the "Wetlanders" installed a diked area and a pumping system at several locations to supply these needs. Within the dike the land is either left in native foods or planted with crops beneficial for waterfowl. Water is pumped out in the spring and pumped back in the fall. The dike and other places are managed as nesting areas.

An 80-acre marsh adjacent to Lake Butte des Morts, too wet to cultivate, was covered by sedges and cattails that provided little waterfowl food. This area was enclosed by a ditch and dike and a two-way pump installed. It is drained about May 1 and kept dry during the growing season. Crops such as buckwheat and Japanese millet are planted. About October 1, 2 weeks before the duck season opens, the pump flow is reversed, and the crops are

A marsh crop of buckwheat (above) flooded for duck food on a former cattail marsh.

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flooded to a depth of 4 to 8 inches. These abundant food supplies usually attract birds in large numbers.

SCS technical assistance has included engineering design of structures, pump capacities, and soil information to assist in selecting suitable land for the dikes and wild-life food crops.

The group is constantly looking for ways to improve operations—for example, new varieties of crops that mature early and produce food for waterfowl, agricultural practices that increase crop yields, and new and improved pumping systems.

Since areas are low and wet, it is difficult to begin working the land until mid-June. Frosts can be expected in early September so crops do not mature seed every year. Mini milo, a quick-maturing, heavily producing hybrid sorghum now is being tried with some success.

Some areas are being tiled to allow draining earlier in the spring and earlier planting of crops. Many of these areas have a permanent builtin pumping system which utilizes propeller-type pumps capable of moving a lot of water quickly. Some "Wetlanders" are now using portable pumps with similar capacities.

Hunting takes place on most of their lands, but the "Wetlanders" are more concerned about bringing waterfowl to their area than in shooting them. From spring to fall they will scan the waters, marshes, and skies for signs of birds. They hope, because of their efforts, to see many of them return.

Conservation in action . . .

From sagebrush to waving grass

Utah

Sagebrush has been transformed to waving grass and good-quality browse on more than 50,000 acres of rangeland in the Uintah

Basin Soil Conservation District of eastern Utah.

With technical assistance from the Soil Conservation Service, ranch-

ers have aerial sprayed up to 12,000 acres of sagebrush range every year. Better management of state and private lands after spraying also has helped to make this change.

"You wouldn't believe it's the same range," said Dean Reynolds of Vernal, Utah. "Low-producing sagebrush range becomes a meadow of waving grass and healthy bitterbrush after spraying and deferring."

Sagebrush is a low forage producer but a high water user. Its deep tap root robs much water from the soil, yet offers little protection against erosion.

Ranchers have found that spraying sagebrush gives up to four times as much grazing capacity, increases stream and spring flow as much as 33 percent, and decreases the number of poisonous plants up to 80 percent. Elk, deer, grouse, and other wildlife also benefit from the improved forage grasses and sagebrush.

Ranchers have learned too that spraying should be followed with a period of no grazing—at least from the time of spraying to the fall of the next year. This no-grazing period allows the grass plants to grow and fill in the bare spaces. The additional grass produces better protection against erosion and more forage. And two or three times the number of desirable plants may result.

Aerial spraying with 2, 4-D dur-

Two years after spraying of dense sagebrush (left) a Utah range (right) is in excellent condition for livestock and





ing the spring planting season when rapid-growth occurs has been a very effective method of sagebrush control. Cost has varied from \$2.50 to \$3.75 an acre, but with good management benefits will continue for 15 to 20 years.—MARK M. PETERSEN, district conservationist, SCS, Randolph, Utah.

Virginia

How to make a family farm pay

Following a conservation plan can mean more income, especially when the plan includes diversified farm operations, says John T. Butler. He has been a cooperator since 1952 with the Peanut Soil and Water Conservation District in Isle of Wight County, Va.

On his 690-acre farm, Butler has been a pioneer in minimum tillage and now has a high yield of corn, silage, peanuts, soybeans, and hay as well as good protection of the land. All wet soils have been drained by 24,400 feet of tile and 11,000 feet of open ditches. In addition, he was one of the first in his area to harvest and dry peanuts, using large-scale custom drying and buying facilities. On his timberland, he follows woodland-improvement practices. And he also finds time to tend hogs and 300 beef cows.

In 1967, after several dry years, Butler decided that irrigation would increase his income. He wanted to make the farm profitable enough so that his son Johnny would come home after finishing college. With the help of the Soil Conservation Service, he planned and constructed a 20-acre lake which supplies enough water to irrigate 150 acres of high-quality pasture, corn, and peanuts. The next spring, he put in a sprinkler-irrigation system.

Butler's farm seemed complete. But then the author suggested adding campsite facilities by the lake. In winter 1968, Butler added a large swimming and beach area, rest rooms with hot and cold water, 45 campsites each with water and electricity, a large recreation area, and a commissary. He and his farm laborers did most of the work. The first summer was a success. The lake, stocked with fish, attracted many from metropolitan Hampton Roads, only 30-40 miles away.

By winter 1969, he had installed 12 more campsites with sewer, water, and electric connections for year-round campers; another rest room; an artesian well to supply water for the swimming pool and future installations; and an access road, approximately ½ mile long, which opens up 45 more of the 250 sites planned for the lake.

In 1970 a motorcycle trail and nature trail were added. Even a golf course may soon be part of the recreation complex. Johnny is now back on the farm and plans to manage the recreation enterprise.

Butler feels that campsites are a good way to make the farm pay and, at the same time, to utilize labor and equipment already on hand.

He enjoys talking with the campers and likes to show them his farm operation. He is proud that his efforts have produced something his family and nearby communities can enjoy.—HARRY O. DALTON, soil conservation technician, SCS, Isle of Wight, Va.

Wisconsin

No more water in the barn

"The floodwater will never run through my barn again," said Lloyd Tweseme about his new flooddetention dam. Lloyd and his son Robert farm in the upper reaches of Lake Coulee in the Trempealeau County Soil and Water Conservation District in western Wisconsin.

"You wouldn't believe it now," said Lloyd, "but back in July 1969, I had to open both barn doors as water flowed through over a foot deep." A 5-inch rain brought runoff roaring out of the 135-acre drainage area.

The large earthen dam was designed and construction supervised by the Soil Conservation Service.

The structure reduces the rate of runoff coming down the valley by one-sixth and controls an active 12-foot gully that has been creeping up the valley. The eroding ditch below the dam was filled and made into a grassed waterway. The Twesemes expect a sharp reduction in pollution from sediment washing out of the ditch and filling downstream fishing holes, as well as pollution from animal wastes caused by runoff through the barnyard.

A small spring flow brings water to the 1-acre pond created by the dam. Besides many hours of fishing, swimming, and other family recreation, the pond provides wildlife habitat, especially for deer.

Gazing around the silent peaceful valley Lloyd added, "This country needs a whole lot more of this kind of dam."—OLIN C. FIMREITE, district conservationist, SCS, Whitehall, Wis.

Central Nevada gets new planning program

A 2-year Multicounty Comprehensive Planning Program for central Nevada began last October when a contract was signed by the Central Nevada Resource Development Authority (CNDA) with the Nevada State Planning Board.

Approximately two-thirds of the estimated \$60,000 program costs will come from a Department of Housing and Urban Development "701" Planning Grant; the rest will be raised locally.

The CNDA advisory planning commission serves as the steering committee for the Central Nevada Resource Conservation and Development Project and also is the designated regional planning commission for the area. Soil conservation district supervisors, who are among the sponsors of the RC&D Project, are represented on the Authority's Advisory Planning Commission.

The new program complements objectives developed by the Central Nevada RC&D Project sponsors. It will provide more information on

needs, problems and potentials of the area. As a result local people will be in a better position to establish priorities for RC&D project measures. They also can better correlate the use of available resource conservation and development costsharing funds with overall areadevelopment needs. Most project measures will be constructed under the guidance of the CNDA, and some probably will include development of outdoor water-based recreational facilities.

"Progress through cooperation" is the motto adopted by the Authority. — ALBERT NEU, RC&D Project coordinator, SCS, Austin, Nev. ◆

Meetings . . .

AFFCO concentrates on fire in environment

A 2-day symposium on "Fire in the Northern Environment," April 13-14, Fairbanks, Alaska, is being sponsored by the Alaska Forest Fire Council. The council represents governmental, educational, and private groups concerned with wild-fire and its effects in Alaska.

The symposium will be in two sections: "Fire and the Environment" and "Fire and Man." Papers to be presented include fire-vegetation relations; fire and wildlife; fire, air, and water resources; permafrost and wildlife; effects of wildlife on the economy; fire and military operations; fire control; and state and local government.

ASAE takes up livestock wastes

An International Symposium on Livestock Wastes, sponsored by the American Society of Agricultural Engineers and Ohio State University, will take place April 19-22 in Columbus, Ohio.

Authorities in the livestock waste

field will present papers on wastedisposal systems, beef feedlots, hydraulic transport of wastes, waste characteristics, economics, aerobic treatment, composting, land disposal, storage, refeeding, solid-liquid separation, and legal considerations.

Youth Science Fair Dates and places

The 14th Youth Science Fair sponsored by OPEDA and USDA will be held May 5 at Beltsville, Md. Nine students from each of five area school fairs will show their science exhibits and receive certificates for their achievements. Here is a chance for junior high and high school students of SCS employees in D.C. and neighboring Maryland and Virginia counties to show their scientific know-how—and maybe their conservation bent.

Dates and places

April 13-14, Alaska Forest Fire Council symposium, Fairbanks, Alaska.

19-22, International Symposium on Livestock Wastes, Columbus, Ohio.

21-24, Urban Land Institute, New Orleans, La.

May

2-8. Clean Waters for America Week.

3-6, Garden Clubs of America, St. Louis, Mo.

3-7, League of Women Voters of the U.S., Washington, D.C.

3-7, International Symposium on Manmade Lakes, Their Problems and Environmental Effects, Knoxville, Tenn. Organized by the Scientific Committee on Water Research (COWAR) on behalf of the International Council of Scientific Unions (ISCU).

9-12, National Forest Products Association, Washington, D.C.

16-21, National Council of State Garden Clubs, Bal Harbour, Fla.

16-23, Soil Stewardship Week.

20-24, National Audubon Society, Milwaukee, Wis.

23-26, Northeast Conservation Engineers and Northeast Fish and Wildlife Conference, Portland, Maine. ◆



Nutrient Mobility in Soils: Accumulation and Losses. EDITED BY O. P. ENGELSTAD. Soil Science Society of America, Madison, Wis., Spec. Publ. 4. 81 pp., illus. \$3.00.

This book includes five papers presented at a symposium during the 1969 annual meeting of the Soil Science Society of America.

The first paper, "Soil and Climatic Factors Which Affect Nutrient Mobility," by Grant W. Thomas, reviews the chemical and physical properties of soils and types of climate in relation to losses of nitrogen and phosphorus.

Roy W. Simonson discusses "Loss of Nutrient Elements During Soil Formation." He gives most attention to the bases and to phosphorus and shows how extensive past losses by leaching have been in humid climates.

B. A. Stewart discusses nitrates in soil, water, and plants in relation to the agricultural practices of fertilization, irrigation, and management of animal wastes.

W. H. Graham discusses an "Agricultural Nutrient Budget," pointing out mostly our lack of quantitative knowledge but emphasizing that good farming is not incompatible with good streams and lakes.

L. B. Nelson discusses the "Research Needed to Resolve the Plant Nutrient—Water Quality Issue." He points out that this is primarily a field research problem, not one for the laboratory.

These papers reflect the unsatisfactory state of our present knowledge. They show where our knowledge is weak, how we can learn the extent to which farming affects the degradation of streams and lakes, and how we can learn to manage the problems.—Guy D. SMITH, director, Soil Survey Investigation, SCS, Washington, D.C.

New publications

Controlling Erosion on Construction Sites. 1970. USDA Agr. Inf. Bull. 347. 30 pp., illus. \$0.25. Each year more than a million acres of land in the United States is converted from agricultural to urban use-for new houses, shopping centers, schools, industrial parks, highways, and airports needed by our growing population. Urbanizing land also is the source of much of the sediment that pollutes streams and rivers and fills lakes and reservoirs. The bulletin illustrates the damage caused when construction sites are stripped and left bare. It describes the need for selecting land through the use of soil surveys, working out a program for erosion control during the planning and design stages before plans become fixed and construction begins, and applying erosion- and sediment-control measures.

Mulches for Your Garden. BY THE SOIL CONSERVATION SERVICE. 1971. USDA Home and Garden Bull. 185. 8 pp., illus. Shows how good mulch can reduce soil blowing and washing, suppress weeds, keep the soil moist and cool, and add organic matter to the soil. Grass clippings, sawdust, straw, and compost make excellent mulches. Compost is probably the best mulch and can be made from leftover plant materials from the garden. Sawdust makes a good mulch if it is well rotted, or if 1 to 2 cups of ammonium sulfate or sodium nitrate are added to each bushel of fresh sawdust before applying the mulch.

Mulch Tillage in Modern Farming. BY WILLIAM A. HAYES. 1971. USDA Leaflet 554. [8] pp. illus. \$0.15. Mulch tillage leaves residues from the previous crop on or just beneath the soil surface throughout the cropping year. This leaflet presents ways and means of managing the soil for row-crop production by this method and gives factors to consider in buying equipment. Mulch tillage requires less labor, lowers production costs, conserves moisture, improves yields, makes double cropping easier, reduces erosion, and furnishes food and cover for wildlife. It does, however, lower soil temperatures and may increase pest problems.

Urban Land Policy—Selected Aspects of European Experience. Rev. 1970. Dept. Housing and Urban Development, Office of International Affairs Spec. Apt. HUD-94-SF. 219 pp. \$1.75. Discussed are growing scarcity of land available for urban growth in Europe and actions taken by European governments; focuses briefly on increasingly close relationships with economic planning; reviews available data on major European growth patterns and considers the comparative costs of alternative forms of

urban expansion; and summarizes and comments on the lessons learned from European experience.

Selected Programs From Catalog of Federal Domestic Assistance Primarily Applicable to Nonmetropolitan areas (USDA Programs not Included.) 1971. USDA Extension Service. [185 pp.] Lists programs of the Departments of Commerce; Health, Education, and Welfare; Housing and Urban Development; Interior; Labor; Transportation; and the General Services Administration, National Credit Union Administration, Office of Economic Opportunity, and Small Business Administration.

Farmer Cooperatives ... Farm Business Tools. By Beryle Stanton. 1970. USDA Agr. Inf. Bull. 275. 74 pp., illus. \$0.45. Presents general information on the way farmers use cooperatives to improve their farming enterprises; describes—through specific examples—how they do business; gives some of the values farmers receive by doing business cooperatively; and provides some brief historical and statistical information.

Rural Development: How USDA Helps. 1970. USDA PA-963. 14 pp., illus. Lists rural development assistance offered by Cooperative Extension Service, Farmers Home Administration, Forest Service, Rural Electrification Administration, Soil Conservation Service, Agricultural Research Service, Agricultural Stabilization and Conservation Service, Cooperative State Research Service, Economic Research Service, and Farmer Cooperative Service.

The Economics of Clean Water. 1970. U.S. Dept. Interior, Federal Water Pollution Control Administration. Vol. I. 168 pp., illus., \$1.50. Gives current estimates of the investment levels necessary to attain water-quality standards. The report is in four parts: a summary of major findings and conclusions, details of the analysis, a profile of animal wastes, and an industrial profile of the inorganic chemicals industry.

Solid Wastes and Air Pollution. By RICHARD D. VAUGHAN. 1969. U.S. Dept. Health, Education, and Welfare, Public Health Service. 16 pp. States that the present methods for handling and disposal of solid wastes contribute to air pollution. Stresses the need to find ways to economically recover and reuse solid waste material.

Sprinkler Irrigation. By CLAUDE H. PAIR. Rev. 1970. USDA Leaflet 476. 8 pp., illus. \$0.55. Describes types, design, operation, and maintenance of sprinkler systems.

Profiles of Children. 1970. White House Conference on Children 1970. (U.S. Govt. Print. Off.) 187 pp., illus. \$3. A stunning chart book with tables of statistics on many phases of development and welfare of children through age 13.

Laws of the United States Relating to Water Pollution Control and Environmental Quality. Compiled by The Committee on Public Works, U.S. House of Representatives. 1970. Committee Print (91-33). 264 pp. \$1.

Soil surveys

Wake County, North Carolina. By Joel W. Cawthorn. 1970. 118 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by Joel W. Cawthorn, Van S. Jenkins, Ronald B. Stephens, William L. Shope, R. Clyde Pleasants, Daniel G. Spangler, Gordon H. Roberson, Carl E. Eby, Owen R. Demo, James R. Woodruff, John H. Lane, John P. Bryant, Robert M. Craig, Charles D. Sopher, and Don W. Goss.

Kenosha and Racine Counties, Wisconsin. By Ernest G. Link and Owen R. Demo. 1970. 113 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by Owen R. Demo, Orville R. Haszel, Dale E. Jakel, Donald C. Kurer, Ernest G. Link, Albin H. Martinson, Augustin J. Otter, Charles A. Reynolds, Joseph A. Steingraeber, Bruce Watson, Roger Weber, and others.

Cherokee and Delaware Counties, Oklahoma. By EVERETT L. COLE. 1970. 74 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed in Cherokee County by Peter Warth and Dock J. Polone and in Delaware County by Everett L. Cole and Joseph A. Icenhower.

Adams County, Mississippi. By WILLIAM M. MORRIS. 1970. 51 pp., illus.; maps 4 inches to the mile (1: 15,840). Fieldwork by William M. Morris, Jr., Allen C. Milbrandt, and Albert R. Leggett.

Litchfield County, Connecticut. By Walter N. Gonick, Arthur E. Shearin, and David E. Hill. 1970. 105 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by Walter N. Gonick, Berkeley R. Richardson, David B. Thompson, and David L. Yost.

Carbon-Emery Area, Utah. By John L. Swenson, Jr., Duaine T. Erickson, Karl M. Donaldson, and Jungi J. Shiozaki. 1970. 78 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Androscoggin and Sagadahoc Counties, Maine. By Bryce W. McEwen. 1970. 83 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by B. W. McEwen, A. P. Faust, R. B. Willey, O. L. Lavoie, Bruce Worcester, and Lee Bingham.

Talbot County, Maryland. By WILLIAM U. REYBOLD. 1970. 84 pp., illus.; maps 4 inches to the mile (1:15,840).

Recon...

Beautification, minority group employment, and a stronger tax base were among the gifts under 3 million Christmas trees harvested in Michigan last fall. District cooperators and other landowners in 14 counties supplied Michigan's markets as well as outlets in Midwestern States, Florida, Texas, New Mexico, and California.

Reasonably priced planting stock and technical assistance for plantation owners are provided by local districts and SCS. Approximately 600 growers shared a \$6 million return for the record crop. Another \$3 million came to those who harvested, packaged, and transported the trees. American Indians and Mexican Americans who are in Michigan for the cherry harvest also find employment in these enterprises.

No. 1 subject

"Of all the subject matter required for education in our primary and secondary school system, nothing outranks the importance of a strong understanding of the principles involved in ecology and environmental management. I recommend that action be taken to establish requirements in this discipline for teacher certification for teaching at all levels. This discipline should be recognized as more universally important than any present required course. It should be established as a required subject in primary and secondary education in accredited school programs. I recommend that all new teachers, after 1971, be required to qualify in the subject of ecology and environment in order to be certified for a life certificate."—GOVERNOR WILLIAM L. Guy, annual message to State Legislature, North Dakota.

A suit is being brought against Suffolk County, N.Y., by a group which challenges the county's "ecologically unsophisticated, environmentally irresponsible" zoning regulations. Citizens claim that the ninth and 14th Constitutional amendments are violated through abridgment of their right to a livable environment. If successful, the suit would block all local land development until regulations are revised to provide for open space, pollution prevention, and "the highest and best use of each acre." The Avant Gardener commented (Oct. 1970 issue): "Gardeners, whose involvement with environmental restoration is uniquely personal and informed, could accomplish much to save plants, health, and the livability of the community by working with other concerned groups to similarly challenge antiquated zoning laws that permit untrammeled, destructive development."

Fish kills

"The salt marsh produces nearly 10 tons of organic matter on every acre in a year. By comparison, an average yield of wheat is about one and one half tons . . . The best hay lands in this country produce about four tons per acre per year . . . Twothirds of the value of the commercial catch of fish and shell-fish landed on the East coast of the United States come from species that live at least part of their life cycle in the marshestuaries . . . At the very minimum, the country has lost over two million acres of productive shallow coastal water and marsh, more than onequarter of the total, in the course of only thirty-two years (from 1922 to 1954) . . . Between 1954 and 1965, 45,000 acres of salt marsh were destroyed between Maine and Delaware."-John and Mildred Teal, Life and Death of the Salt Marsh.

Sculptured cliffs and islets are intermingled with pools and plantings along 15- to 18-inch berms that rim a newly landscaped lake near Los Angeles, Calif. Soil cement was used

to naturalize the 7.5-mile shoreline of the 150-acre lake. Native rocks set in the cement protect the shoreline yet make the lake edges appear naturally eroded. Four inches of soil cement line the lake to curb percolation and weed growth. "Lake landscaping" is a relatively new twist on the use of soil cement, which has been used for more than 30 years to pave roads, paths, and pond bottoms.

Keep America Beautiful Day will be a high point of SOAR (Save Our American Resources), the conservation program launched this year by the Boy Scouts of America. Campaign objectives are to draw attention to environmental problems and motivate public concern and action. On June 5, 1971, Scouts will lead a nationwide 1-day litter pickup. Whatever they collect will be stacked in conspicuous places as a way of stimulating public awareness.

Auntie Litter has put the finger on 50-odd eyesores in San Antonio, Tex., since the San Antonio Light's editorial writers created her to stir public awareness of the city's litter problem. The sour-faced, elderly cartoon character appears in picture stories published by the Light. The newspaper is determined to maintain the city's nationally recognized reputation for cleanliness. The Nation's 15th largest city twice has been judged America's cleanest city.

A cluster development approach that recognizes the value of agricultural land is being tried in South-ampton, Long Island, N.Y. Under the terms of the pilot project, 80 percent of each farm involved would be deeded to the town and held in trust solely for agricultural use. The farmer would retain not only the first option to farm the property but also the right to sell or develop the remaining 20 percent as intensively as local cluster zoning regulations permit.



Rural America: wide open for what?

Some of the catchwords of our society are becoming less popular today.

To many people in town-and country America, "growth" and "development" may have an unwelcome ring—beca O3 these words may mean changes in a community and its environment that are not necessarily for the better.

- New industries, new homes, new highways and other "improvements" may make living better in some ways, but may also bring crowding and pollution and loss of valuable resources.
- New life in agricultural production may be to no avail if markets or processing facilities are not handy.
- New jobs may not necessarily accrue to the residents when a rural community gets new business activity.
- As we should have learned from past experience, any development based on one or a few resources—timber or coal, for example—may be short lived.

And as an article in Farm Index magazine pointed out, "Many of the people communities hope to attract may have been accustomed to better facilities than some rural communities can offer. New citizens in a town expect schools to be good enough to prepare their children for college. They take it for granted that a good library will be close by. They expect adequate police and fire protection. They assume that the services of health facilities, hospitals, and doctors are available for them and their families. Some of these community services are the very ones that are deficient in rural areas. And a community can't hope to draw and hold new people if it lacks any of these amenities of community life.'

Parts of America outside our metropolitan areas do have space and abundant natural resources, a calmer pace, and some pretty fine neighbors. But rural communities need to be able to offer people more than elbow room. Today's American may not be satisfied with a nostalgic country crossroads.

Rural development, then—a major

American goal to stem the tide of migration to crowded cities—is a task to be undertaken with some thought.

The Soil Conservation Service is glad to be part of the rural development process within a major Department of Agriculture effort. Conservation work has been a major factor in rural and small town development since SCS was formed in 1935. Our extensive field staff of professional conservationists helps spread Federal and many other sources of assistance to local groups, where rural development must have its real energy.

Chief among local groups in a position to aid rural development are America's 3,000 conservation districts. SCS and districts together have experience in working for environmental and economic improvement with individual landowners, groups of people, and governmental units from one small town to a group of counties covering millions of acres.

They bring a body of resource facts and ideas on what other facts are needed to assure desirable community growth.

Facts about the community's resource base are vital. So are sources of technical and financial help. But the key to desirable growth in rural America is the job a community does in choosing the kind of growth it wants—setting its goals for a better life. This is not a job alone for any governmental unit; it must include every interest group and every citizen. It must include more than conservation needs, more than social aims, more than economic considerations—more than any of these for their own sake.

It is a complex task. Choices must be made, compromises worked out. But it can be done; many small towns already have come alive. Much more of rural American can grow in a way that achieves the aims of the people who live there.

The time is now.

Kenneth E. Grant

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Aloha, bagasse—farewell wastes

Farmers near Hilo, Hawaii, have discovered they can grow Christmas trees and the Japanese vegetable, taro, on nearly barren lava rock.

They use a sugarcane waste product, bagasse, as a mulch.

In the process they draw a threeway benefit—reducing erosion, conserving water, and giving their economy a needed boost.

Conservation planning by the area's farmers with help from the Soil Conservation Service was the key. The planning provided for clearing land, planting field windbreaks, and making use of the bagasse.

The bagasse mulch helps the stony soil hold moisture. Windbreaks protect the small plants from wind damage.

Taro is interplanted in the heavily mulched soil with the Christmas trees. This system requires little weed control. The taro adds to farm income until the Christmas trees mature enough for marketing.

Directors of the Waiakea Soil and Water Conservation District have sponsored field trips to farms using the double-cropping system. This enables others to learn profitable conservation farming methods.

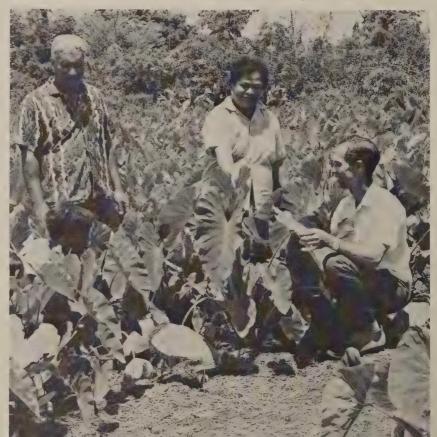
Mary Pea and Ida Iopa, associate district directors, say their taro crop has doubled since they began mulching. Results are proving the system useful to the commercial tree or truck farmer as well as to the backyard gardener.

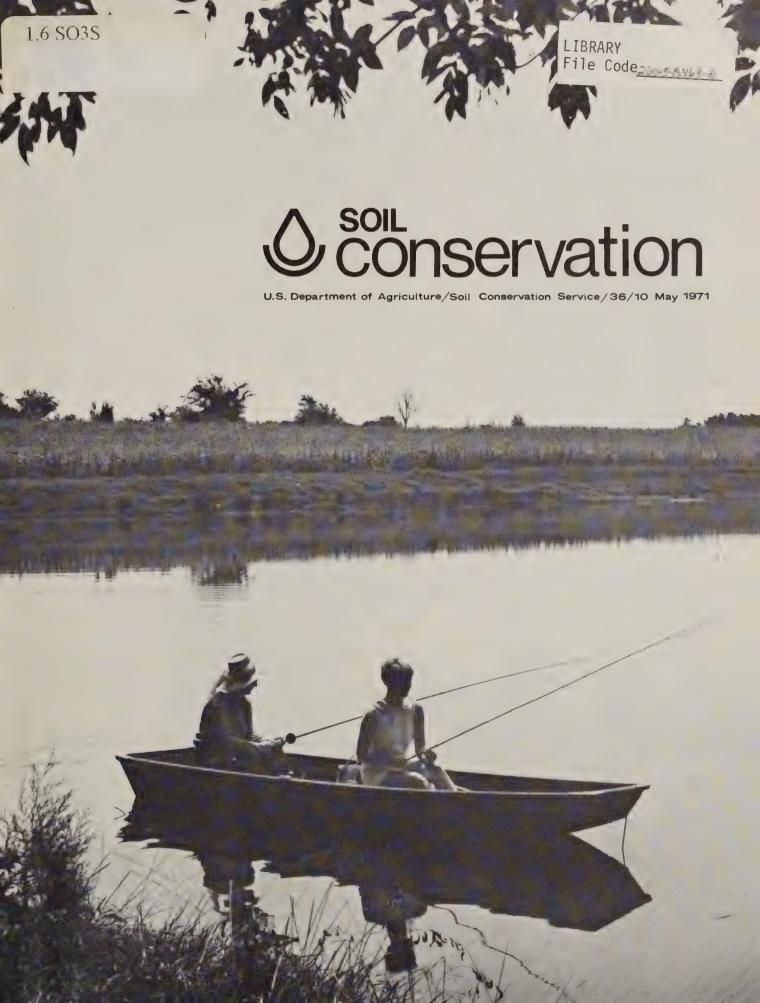
"Before we started to use bagasse, we didn't get much taro," Mary Pea said. "Now we get twice as much taro and better Christmas trees."

Rain and fertilizer would leach rapidly through the unprotected top layer of the Waiakea District's stony lava land. But, district cooperators are learning that almost any fruit or vegetable can be grown successfully with the mulch. Coffee and papaya growers say mulch reduces what they call "vertical erosion"—loss of soil material and plant nutrients caused by rainwater rapidly passing through the soil.

Disposal of the bagasse has plagued sugarcane growers for years. Now the increasing demand by truck and orchard farmers for bagasse may result in a shortage of yesterday's waste.—Otis Gryde, district conservationist for Oahu, SCS, Honolulu, Hawaii.

John and Mary Pea show their high-quality taro crop to Bishop Joseph Borges of the Latter Day Saints Church in Keaukaha, a part of Hilo.





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Water, water everywhere but having enough at the right place and at the right time is a problem in most areas. Where streamflow, or natural lakes, or wells and springs are not enough to supplement rainfall to meet man's needs, manmade lakes are the answer. Called ponds, dams, reservoirs, or lakes, they help meet man's water needs across the Nation. This month, several articles tell how landowners and townspeople brought manmade lakes to their communities and how the water changed their lives.

COVER: A pond adds new enjoyment to a family farm—Gibson County Soil Conservation District, Tenn.

In central Georgia who needs the ocean?

By R. C. Robison
State conservation engineer, SCS, Athens, Ga.

Today, swimming, boating, fishing, and lakeside picnicking are only 30 minutes away from home for the several thousand people in central Georgia. Five years ago, getting to water meant a 3-hour drive.

Water-based recreation in the interior of the state had been scant until the combined efforts of many groups and agencies at local, state, and federal levels brought about Lake Tobesofkee, a 1,750-acre body of water just west of Macon.

Lake Tobesofkee is part of a Public Law 566 watershed project. It was formed by constructing a dam on Tobesofkee Creek, a sluggish Piedmont stream that flows into the Ocmulgee River just below Macon. The lake is about 5 miles long and has 34 miles of shoreline.

A firm of consulting engineers from Atlanta contracted with the Soil Conservation Service for design of the dam. The dam was completed in 1966.

Many of the hills surrounding the lake are covered with pine and have real promise for recreation development. Bibb County Commissioners and SCS joined forces to develop basic recreation facilities in the lake area. SCS gave technical assistance to the Macon architects and engi-





Lake Tobesofkee covers 1,750 acres and stores 25,000 acre-feet of water. Boat launching ramps are in the upper center. (Photograph courtesy of Georgia Forestry Commission)

neering firms that planned the facilities under contracts negotiated with the county.

Four recreation areas were planned for the lower half of the lake. Of these, three have been completed and are in operation. A fifth area is to be integrated later into the upper reaches of the lake.

In the completed recreation areas there are camping facilities for tents and trailers, picnic tables and shelters, hiking trails, and boat launching ramps. Roads are paved. Other facilities include bathrooms with showers and washers and dryers. Water and sewer lines are placed carefully to avoid pollution.

All permanent structures are of concrete and blend into their surroundings; they are designed for long life with low maintenance needs.

The lower end of Lake Tobesof-kee is deep and excellent for boating and fishing. There are swimming beaches in three of the recreation parks. The upper part of the lake, an area of about 500 acres, is shallow. It is excellent for fishing and as habitat for many types of waterfowl. The county excavated a large area of shallow water in the upper part to a minimum depth of 3 feet. The spoil from this excavation was used to build earthen fishing piers,

which allow maximum access to the water for those who do not have a boat.

The outlet structure that controls Lake Tobesofkee is one of a kind in the eastern United States. There are only about five such structures in North America. The structure was designed by a San Francisco engineering firm. It consists of two 40' x 40' delicately balanced steel gates. If the water level in the lake rises because of floodwater, the gates lift and excess water passes under them and on downstream.

This type of outlet structure was chosen over more conventional types for two reasons. First, it cost slightly less than a massive concrete structure. Second, it is safer for users of the lake. On many lakes, the spillway is designed to allow water to pass over the top of a concrete dam; boaters can be swept over this type of structure if they venture too close to it. This cannot happen on Lake Tobesofkee because the water moves under the gates.

The Tobesofkee Creek Watershed Project includes two other flood-water-retarding structures upstream. They, and a land-treatment program throughout the watershed, prevent large amounts of sediment from destroying the usefulness of Lake Tobesofkee.

Besides providing the central Georgia area with water-based recreation, Lake Tobesofkee is storing 25,000 acre-feet of water; 3,500 of this is for industrial use downstream.

The sponsors of this watershed project are the Towalgia and Ocmulgee soil and water conservation districts, Bibb County Commissioners, Georgia Rural Roads Authority, and Georgia Game and Fish Commission, which plans to locate its district headquarters on the shores of Lake Tobesofkee.

The Georgia Highway Department assisted with cost-sharing and supervised construction of three bridges over arms of the lake on roads that had to be relocated or altered because of the lake.

Bibb County is responsible for operation and maintenance of Lake Tobesofkee, including the recreation areas.

The Tobesofkee Creek Watershed Project has been a real asset to central Georgia. And the multiple-purpose aspects of Lake Tobesofkee have added much to the economic strength of Bibb County. About 209,000 people used the lake's recreation facilities between July 1, 1969, and June 20, 1970, and it is estimated that more than half a million people will visit the lake in fiscal 1972.

A big mallard flying in from the north banked slowly and began his descent to the water below. Trailing him in the gray autumn sky were several flocks of redheads, mergansers, and pintails. The water below was already dotted with early arrivals.

This rest stop for migrating ducks and geese is not a wildlife sanctuary. And it is not a hunting preserve. The water is in 15 ponds on the 4,000-acre Elmer Porter ranch near Hubbard, Tex. Elmer Porter plans his ponds for grazing distribution. But tell that to the ducks and geese.

"This is a cattle ranch," Porter said, "but I get particular satisfaction in seeing my livestock ponds used by ducks and geese. This is something I didn't consider when I developed my first conservation plan with the Soil Conservation Service in 1950."

"You just can't get proper use of all your pastures unless you have well-located ponds," Porter adds, "and the more ponds you have, the more pastures you can have." Porter has divided his ranch into 14 pastures. Each is served by a good water supply, and cattle are never more than a half mile from water on any pasture. Porter rotates grazing to take advantage of seasonal

By Bill Owen
Soil conservationist, SCS, Hubbard, Tex.

A pond is more than just a body of water

use and to eliminate spot grazing. He estimates that his stocking rate has risen as much as 20 percent without overgrazing any one pasture.

"Grass is the rancher's crop," states Porter. "The rancher harvests his crop with cattle and sells it as beef. How much beef he gets per acre depends a lot on the location of his ponds. Cattle are lazy—they just naturally tend to stay close to water. They overgraze the grass around ponds and hardly touch the grass on the other side of the pasture."

Porter had noticed this problem on his ranch and began his pondconstruction program soon after he became a district cooperator. SCS personnel at the Hubbard work unit have worked closely with Porter over the years, giving him technical assistance in his livestock-management program.

"When I worked out my first conservation plan with SCS help, it became evident to me that I was having to group too many pastures simply because there weren't enough ponds," Porter said. "Each time I constructed a pond, I was able to revise my grazing plan."

Elmer Porter comes by his live-stock know-how through many years of experience. But success arrived only after much effort. He began farming rented land in this rolling central-Texas community with a pair of mules, a milk cow, and 16 chickens in 1927. Ten years later, he was able to buy his first tract of land—20 acres that were sold for taxes. Today, he owns more than 4,000 acres of pasture and range land.

Porter is well known for his work with minority groups and has inspired many to success through his example and advice. His son, Bernard, is a successful rancher in his own right, and his three daughters are teachers.

Porter is a strong supporter of conservation districts. He is a leader in his community and has served as a church elder for the past 14 years. In 1969 he was winner of the Texas region 5 Comeback Rancher award. He and Mrs. Porter have worked with local 4-H clubs for many years. He has been an active member of that organization for 52 years.

He gets great satisfaction in taking his nine grandchildren fishing. Porter has stocked all his ponds with hatchery fish obtained from the Texas Fish and Wildlife Service.



Elmer Porter plans his ponds for grazing distribution.

Industry take notice: Culpeper has water

Culpeper has water. Fifteen years ago, Culpeper, Va., made an investment in a new lake. The dividends have exceeded all expectations

Water, or the lack of it, had been Culpeper's basic problem. Frequent shortages caused by droughts had kept new industry from locating in the community. Mountain Run as a water source couldn't meet the demand.

Community leaders in and around Culpeper wanted to keep their young people at home. They knew that industrial and community development could do this, but they found that no industry was interested in a location that did not have a dependable water supply.

When the Watershed Protection and Flood Prevention Act (Public Law 566) was passed by the Congress in 1954, the Culpeper Town Council quickly voted to participate in the program and cosponsored a watershed project with the Culpeper Soil and Water Conservation District.

By L. S. Button, Jr. State conservation engineer, SCS, Richmond, Va. The Mountain Run Watershed Project was planned to reduce flooding of valuable agricultural land. The key structure in the project was the multipurpose Mountain Run Lake dam. It was designed to hold back excess floodwater from a part of the watershed and to store 530 acre-feet of water for municipal use in Culpeper. Two single-purpose floodwater-retarding dams also were in the plan, along with land treatment to reduce erosion and siltation of the stream channels and lakes. Construction began in 1958.

The promise of a dependable water supply spurred community development. Construction on a long-needed hospital began almost at the same time as on the Mountain Run dam. The 75-acre lake would furnish the water necessary for the operation of the hospital.

The long-awaited industrial development also began to materialize. Since completion of the lake in 1959, eight industries have located in the community. They have a total investment of \$22 million and annual gross sales of \$20 million. They provide work for 1,245 people. To the town of Culpeper, which had a population of 5,800 at the time, this was a significant development.

Westinghouse plans to build a \$4½ million plant at Culpeper, employing 200 local people. Many other industries have expanded their plants, creating more jobs and a broader tax base. Culpeper is now in a position to choose the industries it wants.

The 1970 census shows that the population of Culpeper County has increased $16\frac{1}{2}$ percent over the 1960 level.

The town sells 1,500 annual permits at \$1 each for fishing in Mountain Run Lake. Sailing and picnicking are also popular there. A park, the first in the county, has been developed adjacent to the lake.

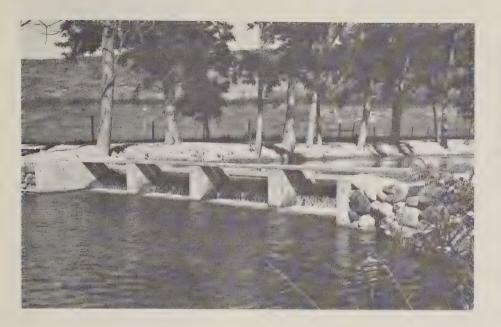
In 1966 and again in 1970, about 60 percent of Culpeper's municipal water was used up during drought periods. Adjoining counties suffered from severely limited water supplies, but Culpeper imposed no restrictions on water use. In fact, Culpeper's water was hauled as far as 20 miles to water dairy herds.

All work outlined in the original Mountain Run watershed plan was completed in 1963. At that time, according to projections, development was progressing at such a rate that Mountain Run Lake would provide only a 4-month supply of water for Culpeper by 1975. Another growing problem was severe flooding of high-value commercial property in Mountain Run's flood plain. The original plan provided protection only for agricultural land.

Project sponsors and SCS reevaluated the Mountain Run watershed work plan and amended it to provide two more dams. One will store 1,000 acre-feet of municipal water. The amended plan also provides for protecting Culpeper from the most severe flood likely to occur in a 100-year interval.

The new multipurpose dam is now designed, and construction is scheduled for this spring.

The Mountain Run Project won the Watershed-of-the-Year award in 1961, presented at the National Watershed Congress. In the 10 years since then, Culpeper has really come alive, and its residents look confidently to the 1970's. ◆



The prospect of making a living from trout farming did not bring George Talbot to Hagerman, Idaho.

Talbot had been looking for a place to raise his Angus cattle; he wanted a nice climate and plenty of irrigation water. He found both in Gooding County. The Hagerman Valley has a mild climate compared to the surrounding Snake River plains and mountains, and 12 cubic feet of water per second gushes from a spring on the farm that Talbot bought.

The farm was large enough to take care of 80 cows and calves.

But after the first summer, Talbot discovered that operating expenses didn't leave much to eat on.

Talbot talked to one of the large commercial rainbow trout growers in Hagerman Valley who was interested in farming out small fish to be raised to market size. The commercial grower furnished the feed and paid \$0.10 a pound gain on the fish. All the farmer had to do was furnish the ponds and labor to feed the fish.

Talbot thought the idea had possibilities. He estimated the cost of a pond at \$1,600. His next step was

to get a bank loan. Then he hired a contractor, and excavation began.

After 2 days, the contractor dug down to what he thought was solid rock. Talbot stopped the work. Trout growers in the area suggested that he contact the Gooding Soil Conservation District and get some

(Top) The structure in the center separates the two ponds and aerates the water. The water is changed twice every hour. (Bottom) George Talbot feeds his trout twice a day with pelleted feed. He made the feeder attached to his tractor at a cost of \$300.

Trout turn a profit on the farm

By Dick Gooby District conservationist, SCS, Gooding, Idaho



professional help before he gave up the project. An inspection of the area by SCS personnel revealed that the rocks were not solid and could be moved easily.

Talbot's original plan called for one large pond, but in planning the project SCS pointed out that there was not enough water for a large pond. Two ponds could utilize the available water more effectively — water would flow from one pond to the other over a drop structure, thus aerating the water.

Talbot went back to his bank. After seeing the plan, the bank loaned Talbot the additional \$600 needed for the project.

In planning the project, SCS personnel located another site where two more ponds could be developed at a cost of \$3,200.

Talbot constructed these ponds the next winter and now is raising fish in four ponds.

The ponds are stocked with 6-inch rainbow trout, which are harvested when they are about 12 inches long. This takes 4 or 5 months. The ponds are stocked two or three times a year, depending on the size of the fish harvested.

The four ponds produced 70,000 pounds of trout this year; at \$0.10 a pound, Talbot grossed \$7,000 from the trout. He grossed about \$11,000 from his herd of Angus cows. Raising the trout cost \$1,780—labor amounted to \$1,080, and the ponds cost \$700 a year amortized for 10 years. The cost of keeping the cows is approximately \$6,000 a year. Talbot's profits for the year then are approximately \$5,220 from the trout enterprise and \$5,000 from the livestock enterprise.

The fish facilities take up only 3 acres of land, and after the water runs through the ponds, it is used for irrigation. "Who would have thought that water and land would return more income from fish production than from beef production?" Talbot asks.



Full-season irrigation and recreation too

Dale Boner and Elwin Ross

District conservationist, Maupin, and area engineer, SCS, Bend, Oreg.

A near-perfect lake site, ample water for storage, and five resolute men. These ingredients produced the Pine Hollow Cooperative, which in turn produced a 235-acre lake for irrigation and recreation in the heart of Wasco County, Oreg.—an area where pasture and hay nearly always dried up before summer's end.

In April 1967, the Southern Wasco Soil and Water Conservation District accepted an application from a group of farmers known as the Pine Hollow Cooperative. Bill and Art Peetz, a partnership, Chet and Leo Brittain, another partnership, and Guy Brittain made up the entire membership of the cooperative. They wanted help in developing a storage reservoir to provide water for late-season irrigation.

The Peetz brothers and the Brittains were members of the Badger Improvement District and got irrigation water through a system of canals from Badger Creek and Three Mile Creek. For many years, their

district had discussed plans to store off-season flows of the creeks. Slow progress toward this end prompted the formation of the Pine Hollow Cooperative.

The objective was to form a cooperative, get an engineering design and financing, and get the project to the construction stage before seeking more members.

A reservoir site that had been surveyed by the Soil Conservation Service years earlier and turned down by the Badger Improvement District as too costly was given a second look. On this off-stream site, near the center of the Badger District, their canal system would be needed to fill the reservoir and distribute water. Water could come from snowmelt. Data from nearby snow-survey courses and streamflow records showed that enough water was available for storage.

Preliminary geologic studies predicted seepage problems at the damsite in the pervious zones of the foundation. Several townspeople witnessed the first stocking of Pine Hollow Lake by the Oregon State Game Commission.

SCS geologists recommended core drilling to get foundation data for the final embankment design. The Pine Hollow group borrowed \$6,000 from a bank; each of the five members cosigned. A core driller was at the site and working in a few weeks. His tests showed that chemical grouting was needed to seal the foundation and thereby reduce water losses to a safe minimum.

SCS completed the design and estimated the project cost at \$350,-000. The Pine Hollow group obtained \$50,521 in cost-sharing through the Rural Environmental Assistance Program of the Agricultural Stabilization and Conservation Service.

They got 55 percent of the construction costs from the Oregon State Game Commission which was interested in potential recreation benefits. The setting among stately pines, the nearness to Portland, and the popularity of small reservoirs gave the area potential. In the final agreement, the Game Commission was to supervise construction and stock the lake. In return, the Pine Hollow Cooperative agreed to public access and use of a 115-acre minimum pool level area.

Wasco County agreed to construct and maintain boat ramps, parking areas, bathroom facilities, and two roads into the lake. In return, the Pine Hollow Cooperative had to purchase and deed to the county the land needed for these developments.

A loan from the Farmers Home Administration left a final cost to the Pine Hollow Cooperative of less than \$100,000. Amortized and including maintenance, the annual cost was figured at less than \$3 an acre-foot of water.

Construction on the project be-

gan on October 7, 1968, 2 years after the Pine Hollow Cooperative was formed. When membership was opened, all landowners in the Badger Improvement District applied.

Art Peetz, secretary and treasurer of the cooperative, kept a record of the activities during the 2-year period. According to him, the five corporation members spent 400 mandays in putting the project together. They had to contact more than 100 individuals.

About three-fourths of the stored water will be available for supplemental irrigation of grain, hay, pasture, and some mint on more than 3,000 acres. The remainder will stay in the lake to insure good fishing.

Economic returns from the project are estimated at \$250,000 from recreational use and \$100,000 from increased farm production. Not included in this estimate is a long-term return to landowners from

selling or leasing nearby lots for summer homes.

What has this project done for this small rural community? Bill Peetz summarizes it saying, "It gave us full-season irrigation this year and much better use of our normal creek flow. This year we had a full second and third cutting of hay. This third cutting alone paid our entire year's water bill." Farmers are buying more irrigation pipe, and people coming to the area for recreation are buying more groceries, gasoline, and fishing supplies from local businesses.

The Dalles Chamber of Commerce in January 1970 gave its Farmer-of-the-Year Award to the five directors of the Pine Hollow Project, and the Oregon Chapter of the Soil Conservation Society of America recognized them with an award for putting together this half-million dollar, multipurpose, water-storage project. ◆

Face lift for Frye Lake

Thirty years of wear and tear have left Frye Lake in bad shape. But a rejuvenation project is already underway, and by late summer this year Frye Lake should emerge anew among the pines of Wyoming's Shoshone National Forest to serve many community needs.

Frye Lake was built in 1941 along the loop road between Lander and historic South Pass City on the eastern slope of the Wind River Mountains. The reservoir was constructed to provide late-season irrigation water for 3,900 acres in the valley below.

Improvements to the lake include 36,000 cubic yards of earthfill, 30 cubic yards of reinforced concrete in the outlet structure, and 5,000 cubic yards of rock riprap on the face of the dam to prevent erosion. Disturbed areas around the dam will

be reseeded to native grasses.

The old lake contained only a small pool of water after the irrigation season. The enlarged lake will hold 1,700 acre-feet of water for many uses. This new lake will provide adequate winter habitat for fish. The Wyoming Game and Fish Department has planned a fisheries program to improve year-round trout fishing at the lake.

The Frye Lake improvement project has been helped and accelerated by community interest and the cooperation between federal and state agencies and private groups, including the Popo-Agie Conservation District, the Fremont County Agricultural Stabilization and Conservation Service, the Soil Conservation Service, and the Forest Service.—Roy H. BUCHMEIER, district conservationist, SCS, Lander, Wyo.



A tale of two dams

By Edgar Baumann
District conservationist, SCS,
Pendleton, Oreg.

P icture two irrigation projects a few miles apart: One still going and relatively free of silt after 4 decades; the other, long ago put out of operation by silt.

Three miles south of Pendleton in eastern Oregon is McKay Reservoir, built by the Bureau of Reclamation in the early 1920's to supply supplemental irrigation water to 18,000 acres. It was constructed on McKay Creek, a tributary of the Umatilla River.

In 44 years, little sediment has accumulated in the reservoir.

Six miles west of Pendleton, near Rieth, is the barely recognizable remnant of another irrigation project—the Furnish-Coe Reservoir constructed in 1909 on the Umatilla River.

Mrs. Frank Sloan of Stanfield says it took only 5 years for that reservoir to fill with sediment and become useless for irrigation.

What made the difference?—land treatment. In the McKay Reservoir watershed, where sudden storms are frequent, only about 12,000 acres out of about 119,000 is in cropland. Most of that is under conservation plans with the Southern Umatilla Soil and Water Conservation District aided by SCS. The district also works with the Bureau of Indian Affairs on many acres of cropland.

Range and woodland management plans are in effect on most of the remaining 107,000 acres.

McKay Reservoir stores 72,800 acre-feet of water behind an earth-fill dam that is 2,700 feet long and 167 feet high.

The Furnish-Coe Reservoir had more than 1,000 acres under irrigation growing grain, potatoes, melons, and other crops. There was no thought of treating land above the dam to hold topsoil in place and out of the reservoir. Thousands of acres of dry cropland in the watershed were unprotected from sudden, violent, flood-causing storms.

The dam was blown open in the early 1930's by the Union Pacific Railroad because the silt-filled reservoir was backing water up and flooding a nearby tunnel.

Remnants of the dam can still be seen today, and in what was the reservoir area alfalfa is growing on some of the finest soil in Umatilla County—topsoil washed down from upstream areas more than 35 years ago.

Irrigation water from McKay Reservoir permits a better use of land and a more stable crop pattern. Instead of losing both topsoil and reservoir, people in the area are getting a bigger crop and more income from their land.

Public utility planning protects resources

operation between sponsors of the Lumberjack Resource Conservation and Development Project and public utility companies in planning regional transmission lines in Wisconsin has made both sides winners-local resources are protected and costs for utility company rightsof-way are decreased.

But this happy ending had a somewhat unhappy beginning when a utility company started negotiating for easements and rights-of-way for a natural gas pipeline through prime forest and recreation lands in Marinette County, Wis.

John Blachowiak, a board member of the Marinette County Conservation District and a director of the Lumberiack RC&D Project, said: "Our forestry committee questioned the wisdom of the proposed route because several miles away a 150-foot electric utility transmission right-of-way ran generally parallel to the proposed pipeline. We didn't want to impede progress, but also we didn't want to destroy our natural resources for a second rightof-way."

The utility company had stated that it would not be feasible for the proposed pipeline and the highvoltage transmission line to share the same right-of-way.

Then negotiations began and brought about the following decision: The proposed gas pipeline was to run along the edge of the existing high-voltage transmission line right-of-way for about 10 miles, thus making it necessary to cut only a part of the timberland.

The decision itself is significant, but so is the fact that the utility companies and county officials cooperated and compromised on such an issue.

"This is the first effort of this kind in our area," commented Rex Taylor, Utility Liaison Committee chairman, Badger Chapter of the American Right-of-Way Association. "We welcome this opportunity to meet with local government and conservation people in evaluating what natural and manmade features in the landscape should be protected in locating transmission rights-ofway."

The directors of the Lumberjack RC&D Project named a committee to promote such cooperation throughout the 10-county project area; the Northeastern Wisconsin Regional Planning Commission voted its support.

As a result of meetings between Blachowiak and Ronald C. Buttke, Wisconsin Public Service Corp., representing the Utility Liaison Committee, each Lumberjack RC&D director was asked to encourage his County Board of Supervisors to designate a person to serve as liaison for right-of-way planning. Counties were asked to start recording on a map features or areas that should be preserved in long-range planning. The Northeastern Wisconsin Regional Planning Commission agreed to help in compiling natural resource data in member counties.

"Establishing a productive working relationship between local government and major public utility companies," says Bernard Stodola, Lumberjack RC&D president, "fits right in with the purpose and goals of our Resource Conservation and Development Project."—ROMAN A. STATZ, RC&D Project coordinator, SCS, Antego, Wis. ◆



Within 5 years, sediment filled the Furnish-Coe Reservoir and made it useless for irrigation. Today, only remnants of the concrete dam remain. (Top, left) In 44 years, little sediment has accumulated in McKay Reservoir, shown here at about half its capacity of 72,800 acre-feet of water.

Manmade lakes

Generally speaking a region's needs for fresh water have to be met from its own supplies; there can be a serious shortage in one part of the country while elsewhere large quantities are flowing unused to the sea.

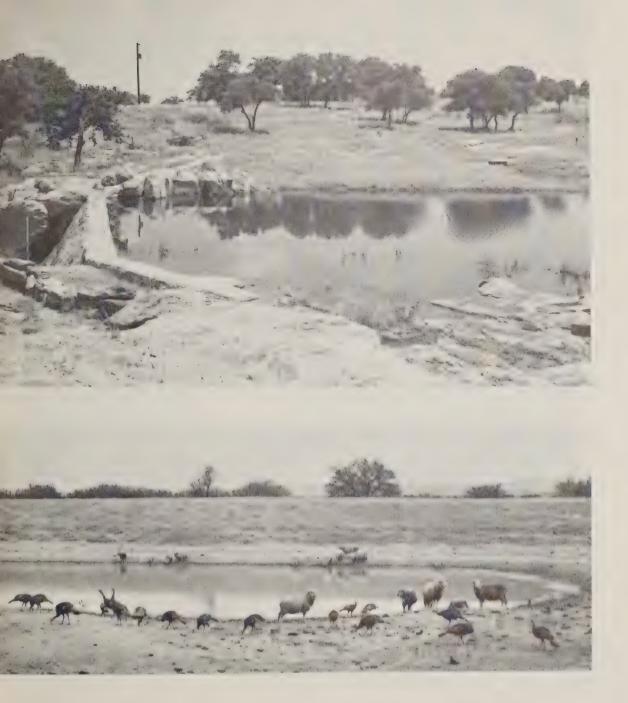
Some areas of the country have concentrated supplies of water gathered in natural lakes or in underground aquifers. But in most areas, manmade surface reservoirs make up the water supply. These reservoirs, which essentially are manmade lakes, have generally been considered as the best means of compensating for natural variations in streamflow.

Manmade lakes range from small farm ponds used for watering livestock to the large multiple-purpose reservoirs used for domestic and industrial water supply, flood control, and recreation.

There are more than 1.7 million ponds or lakes in the United States that were built to hold water for

(Below) Livestock ponds promote better grazing distribution, which means more forage for livestock and wildlife. (Right, top) If soil material is not available or is not suitable for construction, a rock masonry dam can be built where there is solid rock on the sides and bottom. (Right, bottom) This manmade lake attracts wild turkey as well as sheep.





By J. C. Ward
Area engineer, SCS, Fredericksburg, Tex.

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This manmade lake provides water for livestock. The area around the lake has been cleared of heavy brush, and rangeland management has brought back a good grass cover.

livestock, irrigation, wildlife, or recreation. Some of these are in areas where there had been little or no fishing or other water-based recreation for miles around.

Regardless of their use, these ponds or lakes have to be well designed and constructed. A well-designed structure can provide an adequate water supply for 25 to 50 years at an annual cost of about \$0.15 to \$0.25 an acre of pasture. A poorly designed structure may provide water for only one season or 1 year and can cost \$4 to \$8 an acre for 1 year.

In selecting a site for a manmade lake, consider the following:

- (1) The water-tightness of the proposed reservoir area, suitability of the foundation material for the dam and appurtenant structures, and suitability of the soil material for construction.
- (2) Depth of storage area. It must be deep enough to compensate for minor seepage loss, evaporation, and drought.
- (3) The quality of the water for storage. Water for livestock or wildlife must be free of polluting or poisoning agents.
- (4) A proper balance between drainage area and storage area. Generally, a few small lakes in small drainage areas are more practical,

economical, and feasible than one lake in a large drainage area. A drainage area should be large enough to provide the minimum supply of water needed for year-round or seasonal use; it should have a good grass cover and a minimum of silt-producing areas.

(5) A properly designed or natural spillway to handle the estimated runoff from a 25-, 50-, or 100-year frequency rainfall, depending on the design frequency used.

(6) Cost-return benefits.

SCS personnel can help select a lake site to fit the needs and give technical assistance with design and construction of the structure.

Seven years ago the Attmore family said auf wiedersehen to military life in West Germany and purchased a 9-acre farm in the village of Llanito, near Bernalillo, New Mex.

Chuck and his wife Toni wanted something more than army-post life for their children, Suzi and John, and themselves. "Turquoise Trail," as they call their farm, dates back to 1701. Toward the east are the lofty crags of Sandia Mountain and to the west the Rio Grande winds its way through the valley. The charming adobe hacienda in which they live is over 100 years old; from 1880 to 1915 it was used as a dance hall. The opening used for a ticket window is now a fireplace. The previous owner installed windows in the 3foot-thick walls, put in a well and a windmill, leveled the farmland, and built irrigation ditches to take water from the community irrigation canal flowing through the property.

But the farm and house were only part of the dream. Another part came about last September when irrigation water flowed through 650 feet of a newly installed concrete irrigation ditch. The Attmores, as cooperators with the Sandoval Soil and Water Conservation District, have received help from the Soil Conservation Service in conserving and developing their land. They are planning a sprinkler system to irrigate the high land and an irrigation well to provide clean water free of weed seeds.

Chuck still is an Army lieutenant colonel, so his wife manages the farm with the help of her uncle, Ed Snyder. Snyder stopped by Turquoise Trail in 1968 on his way to Mexico where he planned to settle down and write fiction. He never finished his journey. He and Toni already have more than an acre in herbs, vegetables, and nuts. Some of the herbs are anise, caraway, marjoram, mint, oregano, sage, and tansy; vegetables are Chinese snowpeas, yardlong beans, kohlrabi, cheffini, celeriac, garlic, leeks, French carrots, corn, and chuffa By Dick Barber
District conservationist, SCS,
Bernalillo, N. Mex.

Turquoise Trail an open-ended dream

nuts; and the almond and pecan orchard is just beginning to bear. They have some other exotic plants to try on their list.

"We will grow anything people will buy," says Toni, "as long as it is legal and we can get the planting stock or seed. We want to specialize in the unusual. We are supplying specialty foods to Chinese, German, and Dutch restaurants and delicatessens in Albuquerque."

Toni and Uncle Ed also believe in organic gardening. They put sawdust, chopped cornstalks, weeds, and other organic matter through a compost process. They prize earthworms and use insect spray only on corn. Chopped onion, garlic, and coriander tops are used to repel insects.

"Most of our soil is heavy clay," Uncle Ed says. "When dry it is hard as a brick, and it takes water slowly. I have to use a small stream in each row to allow time for soaking. If we ever get enough organic matter into our soil, it will soak up water faster."

The rest of the dream? Toni hopes to build an arts and crafts center and sell weaving, art metal work, mosaics, and ceramics. Chuck, after military retirement, plans to start an import business using the center as an outlet for items such as fine metals and gourmet supplies.

But the dream is open-ended. It is constantly being modified. There have been disappointments and plenty of sore muscles, but they are more than compensated for by the Attmores' satisfaction of making use of a small portion of the good earth.

The hacienda at Turquoise Trail enjoyed by Toni Attmore (left) and Uncle Ed Snyder.



New twists to terraces

In Sheridan and Decatur counties in northwestern Kansas, farmers are shifting to new types of terraces where soil and terrain permit.

In that area, as in most of the Great Plains, good farming requires greater conservation effort in checking soil erosion, slowing the rate of runoff, and making better use of moisture.

Harold Lohoefener and his son,

Jerry, who farm in the Decatur County Soil Conservation District, installed more than 5 miles of flat-channel terraces on 231 acres in 1966. The flat channels are 54 to 64 feet wide; there is a low, gently sloping dike 1½ feet high and 25 feet wide at the lower side of each terrace.

"Rain that collects in the channels spreads over a wide area and readily soaks into the ground," Jerry Lohoefener explained. "The water benefits the crop rather than drowns it as sometimes happens on conventional terraces in this area.

The Lohoefeners reported that in the fall of 1968 two rains of about 3 inches each caused overtopping and some damage to conventional terraces. But on the flat-channel terraces the water soaked into the soil in 48 hours.

"Regular terraces stay wet longer than flat-channel terraces," says Jerry Lohoefener, "so harvesting is easier on the new terraces, and our big machinery works better on them because of the gentle front and back slopes."

Crop yields are reduced the first

Corn can grow on this field without irrigation because the flat-channel terraces hold more moisture than other terraces.



The white tape and the rod held by the farmer give an indication of the slope of this level parallel terrace.



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few years where deep cuts are needed for the wide channels. But there is more blending of topsoil into cut areas on these terraces than in the extensive cuts made in land leveling for irrigation.

The short, extra point rows that occur when crops are planted in contoured parallel rows between nonparallel terraces are fewer with flat-channel terraces. And fewer terraces are needed in a field; thus, there are fewer terrace intervals where point rows can occur.

"We believe that the flat-channel terraces are well worth the extra cost," Jerry Lohoefener said. The Great Plains Conservation Program made it possible for them to go ahead with the new terraces.

Another type of terrace that is gaining favor in western Kansas is the level parallel terrace.

Sheridan County farmland has long, even slopes that make this type of terrace practical. Level parallel terraces in Kansas are limited to semiarid areas of permeable soils where holding water on the land helps to increase the ground-water supply as well as to control erosion. On less permeable soils and in areas of higher rainfall, graded parallel terraces can be used.

Parallel terraces eliminate point rows, speed up farming operations, help to control erosion, and make maximum use of rainfall.

In spring 1969, Murray Custer, a cooperator with the Sheridan County Soil Conservation District, built 3,741 feet of level parallel terraces on 63 acres. The cost was no greater than for conventional terraces.

Cuts and fills on the long, even slopes of 0.8 to 1 percent were made with a paddle wagon. Soil was elevated first to the ridge from the upper side with an elevating terracer or grader and then into the terrace channel; a motor grader was used to smooth out the terraces. The terrace channels are 35 to 40 feet wide and 300 feet apart. An occasional nonparallel terrace was needed to bring the terracing back to a

cross-slope orientation to avoid excessive excavation.

Custer's terraces are designed so that 90 percent of a 6-inch rain can be absorbed into the soil.

"The field farms a lot better since it was parallel terraced," Custer reported. "It's easier to operate equipment where terraces are parallel."

Custer uses a wheat and summer-

fallow rotation on his parallel terraced fields.

The terrace system was designed and laid out by the Soil Conservation Service. Custer received costsharing from the Rural Environmental Assistance Program.—John C. Dark and W. Dale Younkin, district conservationists, SCS, Oberlin and Hoxie, Kans. ◆

Conservation in action . . .

Something for everyone

"Something for Everyone" is the motto of a 500-acre recreation complex that stretches along the shoreline of Tennessee's Center Hill Reservoir.

The motto probably has deeper meaning than the developers realized when they picked it, for the development has brought something for everyone in the area—scenic beauty, recreation, an improved economy.

Aaron Durham, president of Land Developers of Four Seasons of Tennessee, gives much credit for the success of the development to conservation organizations. W. R. Lassiter, DeKalb Soil Conservation District chairman, said, "These developers realize that conservation is as necessary on a recreation area as on cropland, pastures, or woodland. At their request we provided planning assistance and other help that is available through the Soil Conservation Service."

SCS helped locate soils suitable for septic-tank absorption fields in areas set aside for houses. SCS also helped find stable soils for scenic drives and horseback-riding trails.

A critical area that was not left unprotected.



The roads and trails wind through stands of beautiful southern hard-woods that frame scenic views of the lake. An effort was made to save beautiful trees, especially red-buds, dogwoods, and other flowering species.

"By following the advice of SCS specialists," claims Durham, "we were able to establish a good cover of grass on unprotected areas, including roadbanks and steep places around the marina."

Facilities of the Four Seasons of Tennessee development include a championship golf course, lighted tennis courts, a marina with complete boating and fishing facilities, a lodge and restaurant, indoor and outdoor swimming pools, a 100-room inn, a stable and training center for Tennessee walking horses, a show arena, and 6 miles of riding trails.

"The green carpets of grass have been a strong selling point in our development," Durham stated, "and the grass and other conservation measures that we applied have prevented tons of soil from washing into Center Hill Lake."

"Four Seasons has improved the economy as well as the environment of our entire county," said Bob Ridner, a director of the Hull-York Lakeland Resource Conservation and Development Association and secretary of the Chamber of Commerce of DeKalb County. DeKalb is one of 11 counties in the Hull-York RC&D Project area. The Hull-York Association is promoting the conversion of submarginal agricultural lands to recreation and other uses.—NEIL DUDNEY, district conservationist, SCS, Smithville, Tenn.

Learning irrigation at Lincoln

Irrigation is a fast growing industry, and heavy enrollment in an irrigation course at the SCS Midwest Training Center, Lincoln, Nebr., bears this out.

The water-management course draws people from throughout the United States and from foreign countries. SCS employees as well as other government people can take the 2-week course, which has been improved and expanded since it was started in 1962. Those completing the course should be able to help a landowner test his irrigation system to determine if he's making the best possible use of his water.

Lincoln is one of two SCS training centers offering the course.

Lincoln's course has its own out-

Marvin Barber (foreground), an instructor at the Midwest Training Center, is regulating the ditch flow. His students are measuring the flow with pendvane and Parshall flume devices. door laboratory. In 1965, the University of Nebraska agreed to let SCS use 8 acres of its field laboratory at Mead. SCS designed, staked, and paid for necessary structures; the university paid for land leveling and a waterway. The university plants and harvests the crops and supplies water.

After a week in the classroom, students move out to the field laboratory. There they measure the effectiveness of various irrigation systems; they determine soil moisture, water pressure, and land slope and gather other pertinent data, just as they would for a landowner. They determine how much water is put on a field in a certain length of time (the water can be controlled from a trickle to 1,000 gallons a minute) and measure how much runs off. They then can determine an effective application rate.

Students get a chance to evaluate many different irrigation systems at the field laboratory, including the SCS-installed furrow and border



systems and university sprinkler systems such as the center-pivot and tow-line. They also study re-use systems and various kinds of pipe.

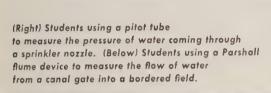
L. F. Joris, head of the SCS Midwest Training Center, and Grant Woodward, SCS irrigation specialist at the center are concerned about the rapid increase in water use and the need to use this resource without waste or undue lowering of quality.

"The East and Midwest do not depend entirely on irrigation to raise crops, but the people there are irrigating more than ever," Woodward says. In fact, these areas are our fastest growing irrigation section. From 1960 to 1969, irrigated acreage increased 96 percent in Michi-

gan, 59 percent in Nebraska, and 140 percent in Wisconsin. These compare to a national average of 35 percent.

According to Woodward, the 1964 projections of 50 million irrigated acres in the United States by 1980 have fallen short by almost 10 years. There are nearly that many irrigated acres in the United States today.

The training course has served and will continue to serve people from arid regions where irrigation has long been practiced, but Woodward and Joris both feel that the course takes on new value for the newcomers in irrigation. — LYNN BETTS, information specialist, SCS, Lincoln Nebr. •







Log cabin revival

Many trees suitable for the construction of log cabins are maturing on more than 50,000 acres in New York. The trees are in state-owned plantations in the South Central New York Resource Conservation and Development Project area, which embraces seven counties. There also are cabin-size trees in privately owned plantations covering extensive areas.

Philip C. Comings, chairman of the steering committee of the South Central New York RC&D Project, believes that there is a market for the seven-county area's trees. An RC&D Project objective is to encourage resource-based industry to provide employment and profit for local people.

According to Comings, outdoor recreation has a high potential in

all seven counties—Tioga, Cortland, Madison, Broome, Chenango, Otsego, and Delaware. "About 50,000 log cabins—vacation houses, hunting lodges, lodging for campers, or year-round residences—can be built with the area's softwood timber," claims Comings. "A log-cabin industry in the area can provide 5,000 man-years of employment."

Richard Howard, the project's forester, has constructed a model of a log cabin and has prepared plans for factory production of log-cabin parts.

More than 54 firms, wood processors, and potential backers have asked for plans and specifications for the log cabins; one firm has begun production, and another is displaying models of the cabins it will make.—Meredith A. Peters, state woodland conservationist, Syracuse, N.Y. and MILO E. Thompson, former project coordinator, SCS, Norwich, N.Y.

Moon rock tells resource story

A drab-looking moon rock stole the show at the Carter County 4-H Fair in Elizabethton, Tenn. The Carter Soil Conservation District board members featured the rare lunar stone in their booth.

How do moon rocks tie in with conservation? Jess Clark, chairman of the Carter District board, explains it this way: "Without the good earth's life-giving resources man could not have gone to the moon and back."

Actually, the connection is more personal than rocks and conservation might indicate. Astronaut Alan Bean, the fourth man to walk on the moon, is the son of retired Soil Conservation Service employee Arnold H. Bean. The senior Bean retired as watershed planning specialist in 1965.

The Carter District board was hard pressed to acquire the moon

sample. There are some 1,500 requests to exhibit samples of the moon rock. The Carter District, through its representative in Congress, made arrangements with NASA to obtain the sample.

J. B. Holt, who is a cooperator and consultant to the board of supervisors, flew to Washington and picked up the exhibit. NASA required that the 3.2 billion-year-old rock be kept under guard while on display and locked in a vault after exhibit time. The Elizabethton Police Department and the Carter County Sheriff's Department alternated in providing guards.

"This proved to be the most interesting and educational project our district ever attempted," Clark said. "Local interest and response was overwhelming."—James Eldridge, district conservationist, SCS, Elizabethon, Tenn.

Meetings . . .

Symposium to be held on manmade lakes

Sponsored by the Scientific Committee on Water Research on behalf of the International Council of Scientific Unions, an international symposium on manmade lakes, their problems and environmental effects will be held May 3-7 in Knoxville, Tenn.

Arrangements in the United States are by the National Academy of Sciences, the Tennessee Valley Authority, and the University of Tennessee.

The symposium will be organized around (1) broad, interdisciplinary case studies of the world's great manmade lakes and collections of lakes, (2) regional summaries and discussion of the conference topics, and (3) visits to TVA projects.

Principal topics include: Manmade lakes of the world; case studies of major lakes; reservoirs as physical systems that include hydrology, meteorology, geophysics, and limnology; reservoirs as biological systems including aquatic and terrestrial ecosystems; reservoirs in relation to man, archaeology, resettlement, agriculture and wildlife, fisheries, health, transportation, and tourism; and management for multiple use.

NCSGC to spotlight creativity

The forty-second annual convention of the National Council of State Garden Clubs will take place May 14-20, Bal Harbour, Fla. It plans to have as its theme, "This World of Creativity."

Topics include: "Creativity and Environment," "Creativity in Youth and Knowledge," and "'Creativity' Yesterday—Today—Tomorrow."

Audubon after the ecology generation gap

"Bridging the Ecology Generation Gap" will be the theme of the 66th National Audubon Convention at Milwaukee, Wis., May 20-24.

Programs on May 22 and 23 present "student leaders, the young environmentalists challenging the establishment, who have let the world get on a toboggan."

Solutions to the "complex problems of the polluted Great Lakes from slightly tainted but threatened Lake Superior to dying Lake Erie" will be sought in a special panel discussion.

Field trips include visits to the geologically and ecologically fascinating Wisconsin Dells, Horicon Marsh, and the North Kettle Moraine.

Dates and places

May 2-8, Clean Waters for America Week.

3-6, Garden Clubs of America, St. Louis, Mo.

3-7, League of Women Voters of the U.S., Washington, D.C.

3-7, International Symposium on Madmade Lakes, Their Problems and Environmental Effects, Knoxville, Tenn. Organized by the Scientific Committee on Water Research (COWAR) on behalf of the International Council Of Scientific Unions (ICSU).

9-12, National Forest Products Association, Washington, D.C.

14-20, National Council of State Garden Clubs, Bal Harbour, Fla.

16-23, Soil Stewardship Week.

20-24, National Audubon Society, Milwaukee, Wis.

23-26, Northeast Conservation Engineers and Northeast Fish and Wildlife Conference, Portland, Maine.

June

6-9, National Watershed Congress, Tampa, Fla.

7-9, American Association for Conservation Information, Springfield, Mo.

13-18, American Water Works Association, Denver, Colo.

14-18, American Water Resources Association and University of Wisconsin-Milwaukee Research Conference on Planning for Water Quality and Standards, Milwaukee, Wis.

19-25, Outdoor Writers Association of America, Inc., Pensacola, Fla.

21-23, American Water Resources As-

sociation and Cornell University, Symposium on Social and Economic Aspects of Water Resource Development, Ithaca, N.Y.

26-30, Air Pollution Control Association, Atlantic City, N.J.

27-30, American Seed Trade Association, St. Louis, Mo.

27-30, American Society of Agricultural Engineers, Pullman, Wash.

27-July 2, National Education Association, Detroit, Mich.

27-July 3, National Environmental Health Association, National Watershed Congress, Portland, Oreg. ◆

New publications

100 Native Forage Grasses in 11 Southern States. By Horace L. Leit-HEAD, LEWIS L. YARLETT, AND THOMAS N. SHIFLET. 1971. USDA Agr. Hbk. 389. 216 pp., illus. \$1. Presents 100 native grasses on the basis of their importance as forage for both domestic and wild animals or as indicator plants of range condition in the states of North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, and Tennessee. It gives the principal parts of a grass plant and native grass management principles; it has detailed drawings and descriptions of the grasses. A reference list and a glossary appear at the end of the book.

Environmental Planning: 1, Environmental Information for Policy Formulation. By Michael J. Meshenberg. 1970. Planning Advisory Service Rpt. 263 (American Soc. Planning Officials, 1313 East Sixtieth Street, Chicago, Ill. 60637). 52 pp., illus. \$6. Presents some of the practices that adversely affect our environment; gives reasons for early analysis and environmental planning; describes the types of information needed to inventory and analyze the natural and cultural or manmade environment; and shows how to use the environmental survey. The Appendix gives excerpts from the Interim Guidelines prepared by the Council on Environmental Quality.

Environmental Planning: 2, A Selected Annotated Bibliography. By MICHAEL J. MESHENBERG. 1970. Planning Advisory Service Rpt. 264 (American Soc. Planning Officials, 1313 East Sixtieth Street, Chicago, Ill. 60637). 79 pp., \$6. An annotated, comprehensive list of selected references on the various aspects of environmental planning ranging from general environmental issues and problems, ecology, and population to soil surveys, geology, flood-plain manage-

ment, and landscape analysis. An annotated list of related periodicals is also included.

Conservation Education, A Selected Bibliography, Supplement. Compiled By Joan Caravajal and Martha E. Munzer. 1971. The Interstate Printers and Publishers, Inc., Danville, Ill. 38 pp. Brings up to date materials produced since the bibliography was published in 1968 and contains selected titles on interrelationship of resources, natural resources, role of man, and tools for the teachers from among the many published between 1967 and the summer of 1970.

Soils and Septic Tanks. By WILLIAM H. BENDER. 1971. USDA Agr. Inf. Bull. 349. 12 pp., illus. \$0.15. The number of septic-tank disposal systems, in use for several decades in rural areas and suburban communities, has greatly increased in recent years because of rapid expansion in the suburbs. To help the public get a system that can give years of trouble-free service, this bulletin explains the soil factors that affect septictank absorption fields. It also explains the need to study a local soil survey and soil map. It presents some pointers in selecting a site.

Water Supply Sources for the Farmstead and Rural Home. 1971. Farmers' Bull. 2237. 18 pp., illus. \$0.15. Outlines water requirements and sources for ground water or surface water for farmstead and rural home water-supply systems.

Soil surveys

Sullivan County, Indiana. By Leo A. Kelley. 1971. 73 pp., illus.; maps 4 inches to the mile (1:15,840). Fieldwork by Leo A. Kelly, Ralph H. Sturm, Herbert F. Williamson, and James M. Smith.

Franklin County, Arkansas. BY FRANK M. VODRAZKA, FRANCIS H. STEPHENS, WILLIAM K. GODDARD, AND JAMES W. SPOTTS. 1971. 94 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Carroll and Haralson Counties, Georgia. By J. F. Brooks. 1971. 60 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by J. F. Brooks, T. N. Crabb, and R. D. Wells.

Pemiscot County, Missouri. BY BURTON L. BROWN. 1971. 47 pp., illus.: maps 3.17 inches to the mile (1:20,000). Soils surveyed by Kenneth E. Benham, Burton L. Brown, John P. Francka, Robert J. Held, Billy E. Sparkman, and Gary W. Sturdevant.

Recon...

"Environmental control officer" is a new post in Middleton Township, Monmouth County, N.J. The mayor created the position in the police department. The officer, a combination policeman-educator, is responsible for, among other things, "the detection of land erosion."

"The 'dead of winter' in years gone by may have been the period for a slower pace for Soil Conservation Service people in New Hampshire. Not so now-a-days. Servicing the rapidly increasing requests from towns for resource information and planning assistance, prior to March town meetings, makes the long winter days seem all too short. Principal activities of concern to resource planners are new and amended zoning ordinances and subdivision regulations based on actual resource conditions; solid waste disposal; and resource conservation related legislation." — DONALD G. BURBANK. state conservationist, SCS, New Hampshire.

California's new water-quality law (Porter-Cologne Water-Quality Control Act) expands the definition of "beneficial uses" of state waters to include preservation and enhancement of fish and wildlife as well as esthetic enjoyment of water. Enforcement (including fines of up to \$6,000 a day) may curb polluting practices not traditionally considered within the scope of water-pollution control. For example, action is being taken to prevent damage caused by erosion and siltation resulting from subdivision development.

Absentee landlords in Ohio's Buckeve Hills Resource Conservation and Development Project area were so interested in its conservation services that a spring tree-planting program was organized in response. "Plant a million" was the objective of the campaign recently completed under the technical leadership of RC&D Project Forester John Young, a state employee. Private contractors planted hundreds of thousands of white pines by machine and by hand on private land. By matching their purchases, tree for tree, the West Virginia Pulp and Paper Company encouraged landowners to invest in future forests. REAP cost-sharing on tree costs also boosted interest in the project. "This former cropland," said Paul Dodd, SCS project coordinator, "will have higher-valued tree stands sooner than if left to improve via natural plant succession. The trees also help control erosion on sloping land in Belmont, Noble, Monroe, Morgan, and Washington counties."

Rhode Island residents have an "environmental bill of rights." As amended an original constitutional clause guaranteeing fishing and beach access rights to the people asks due regard for preserving the value of these rights. The state general assembly is now responsible for adequate planning to conserve natural resources.

A rural township in Pennsylvania went to court to keep its character and lost the case, Farm Journal reports. The Pennsylvania Supreme Court recently ruled against the township's zoning ordinance that required homesites of at least 2 acres. Local officials had protested that anything smaller would mean an eventual strain on community facilities, but judges said that the township could no longer "use restrictive zoning merely to avoid dealing with urban growth."

Residents of Rockingham County, Va., recently rallied 'round a radio station to wage war on a local pollution problem. Burning tires had blackened skies within a 15-mile radius of the Harrisonburg city dump on many a morning until radio personalities at Station WSVA encouraged listeners to contact local officials personally to demand an end to the recurring atmospheric eyesore. Within a week, the Harrisonburg city council ordered total enforcement of antiburning ordinances. Within a month, the county board of supervisors prohibited commercial dumping of tires at county dumps.

In Louisville, Ky., more than 98,-000 essays on "Water Pollution— Its Effect on My Community" were submitted to *The Louisville Courier-Journal* during its statewide conservation essay contest. Sponsors, although pleased by the record participation, are concerned with the educational value of the annual exercise.

An "oil-eating" microorganism mixture has been successfully used to clean up trial oil spills in the Potomac River estuary, the Wildlife Management Institute reports. "Petrodeg"—a mixture of marine and terrestrial organisms and chemical nutrients—is being tested by its creator, Bioteknika International, Inc., of Alexandria, Va. In 4 days hungry microbes converted a 100-square-foot oil blotch to carbon dioxide, water, sugars, and proteins.

Six or more attorneys general are to man Pennsylvania's recently created "Pollution Strike Force." Their sole responsibility is prompt enforcement of existing laws in support of the state's intensified antipollution drive.



Better dams for better lakes

Designing dams and reservoirs—for one use or many—calls for blending the professional skills from many disciplines. It takes engineering and sedimentation geologists, hydrologists, hydraulic structure specialists, structural engineers, soil mechanics engineers, construction engineers, recreation specialists, biologists, economists, and planning specialists.

It calls for mixing the science of dam-building with the wishes and needs of citizens and communities who sponsor or will be affected by the project.

The outstanding success of the Soil Conservation Service in helping build manmade lakes is due largely to this integrated approach to design and construction and to the efforts of SCS specialists.

And SCS has become a major builder of dams through hundreds of watershed projects under Public Law 566 and earlier acts. Most are single-purpose flood-prevention structures, but more and more are being built to serve other uses as well—to store water for recreation, for supplying homes and businesses, for irrigation, for livestock, for fire fighting.

Because of growing water-storage needs, watershed dams continue to increase in height, as does the size of the area contributing runoff to the reservoir. We have had to take a fresh look at SCS design criteria that were developed for small dams on small watersheds.

One need is to design earth emergency spillways so that during heavy storms the volume of runoff, and velocity and duration of flow, are not increased beyond comparable values for smaller dams. For dams having a watershed of 5 to 10 square miles, our present design criteria are adequate.

Using earth emergency spillways on watershed dams instead of the conventional concrete spillways has saved millions of dollars. We will continue to use them

wherever they are practical and economical. Where the watershed is large or where dams are in series, auxiliary mechanical emergency spillways of durable materials such as concrete may be needed. The crest of a mechanical spillway has to be lower than that of an earth spillway to keep discharge through the earth spillway within tolerable limits.

We must remain flexible to meet changing conditions. We must seek out, develop, and apply improvements in design theory and practice, materials of construction, construction equipment and technique, foundation exploration equipment and technique, and other methods that lead to technical excellence in performance.

It is part of the SCS aim to maintain a sound technical base for all of our operations.

Kenneth E. Grant

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Fishing in a farm pond

If your favorite fishing stream has been ruined by too many fishermen, try a farm pond. Many farm ponds that were built primarily to supply additional irrigation water have been stocked with fish and opened to the public. These private ponds are relieving the overcrowding on many streams and lakes.

In the past 10 years more than 400 fish ponds have been built by farmers in the Uintah Basin Soil Conservation District in Utah. The

ponds range from less than 1 surface acre to 1,300 surface acres. The Soil Conservation Service has helped with the technical planning of these ponds. The Bureau of Sport Fisheries and Wildlife has furnished rainbow trout for stocking. Many farmers have stocked their ponds with fish from private hatcheries.

The Uintah Basin is bordered by the high Uintah Mountains on the north and the wild and rugged Book Cliffs on the south. Every year thousands of people come to hunt, fish, sightsee, or just relax in this beautiful eastern Utah area.

It is estimated that private fish ponds in the Uintah Basin are visited by more than 5,600 people each year.

Grant Hansen, a district cooperator from Altamont, estimated that more than 300 visitors fished in his 18 stocked ponds last year. "Families from the city camp the entire weekend at my ponds," Hansen said. And District Supervisor DeVon Mc-Kee from Tridell stated, "It's not uncommon to see three or four campers at a time parked by one of my ponds."

Some pond owners ask only that visitors respect property: ask for permission to fish; do not damage or destroy property; leave it clean; and close the gates. But many consider fish ponds as a source of income. For a small fee, a family can enjoy a nice outing where there's plenty of fish and lots of privacy. Membership in a sports club may be required for fishing in some private ponds. Some private ponds are open the year-round.—Mark M. Petersen, district conservationist, Randolph, Utah.

You fight the fish, not the crowds on private fish ponds in the Uintah Basin.



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This month SOIL CONSER-VATION takes a look at pollution and its control. SCS Administrator Grant's message outlines some steps that SCS and conservation districts are taking in pollution abatement. The lead article tells about several Louisiana dairymen who have installed animal-waste disposal lagoons. Other articles: Pennsylvania teenagers hauling garbage and cleaning out ugly streams; Colorado mine operators making stripmined areas beautiful again; and in Virginia, an entire county working to halt deterioration

COVER: Sunshine and sunflowers—so much a part of the natural environment when pollution is not around. The Sangre de Cristo mountain range (Colorado) in the background.

of the environment.

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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hello, lagoon

One hundred and fifty head of cattle create a lot of waste. And Charlie McDaniel of Wilmer, La., remembers well the problem of disposing of that waste.

McDaniel eliminated this problem by installing animal-waste lagoons. Not only has he cut the cost of keeping his 150 head of cattle, but also he doesn't have to worry about unsanitary conditions in his milking parlor and pollutants in his livestock pond and in nearby streams.

McDaniel is one of about 35 dairymen in St. Helena and Tangipahoa Parishes who have animalwaste lagoons completed or under construction.

James Sumrall, from near Kentwood, was the first in Tangipahoa Parish to finish his lagoons, and he was among the first in the state. Sumrall knows the importance of keeping pollutants out of streams, and he's pleased about cutting cleanup costs by about 80 percent. "Before the lagoons," he said, "hired hands picked up the waste with shovels; now I clean up just with water." Savings in cleanup labor and

goodbye, pollution

(Below, left) Animal waste is worked into a pipe that carries it to the first of two disposal lagoons. (Below, right) Waste from the holding lot is broken down into gases, minerals, and sludge by anaerobic bacteria in this lagoon.

chemicals for insect control will amount to about \$1,200 the first year, claims Sumrall.

Guidelines and design for lagoon waste-disposal systems were developed jointly by the Milk Division of the Louisiana State Board of Health, Louisiana Cooperative Extension Service, Agricultural Stabilization and Conservation Service, and Soil Conservation Service.

In a lagoon waste-disposal system, waste material is broken down in two lagoons or pits by two types of microbes—anaerobic and aerobic bacteria. The breakdown is similar to biological activity on waste material in a cesspool. Generally the waste material is removed from the milking parlor and holding lot with





a water hose. It is forced into an entrance pipe at the lowest point of the holding lot, and it empties into the anaerobic bacteria pit. This pit has 8 to 10 feet of water. The oxygen level at this depth is near zero, which is ideal for the growth of anaerobic bacteria. As much as 70 percent of the waste is broken down into gases, minerals, and sludge in this pit.

Liquid effluent from the anaerobic pit flows through a pipe into the aerobic pit. The pipe is at the center of the levee between the two pits. The aerobic pit has 5 feet of water; the oxygen there is sufficient to support the growth of aerobic bacteria. The breakdown process is completed in this pit.

The liquid that runs out of the exit pipe generally is recycled to the land for use by plants.

SCS helps cooperators of the Bogue Chitto-Pearl River Soil and Water Conservation District in designing and laying out their animalwaste systems. The size of the lagoons depends on the amount of raw waste going into them. The cost of the lagoons, including excavation, metal or plastic piping, fencing, and sodding of levees, ranges from \$600 to \$1,000.—MAX BAER, district conservationist, SCS, Amite, La.

Liquid effluent from the anaerobic pit flows into the aerobic pit for complete breakdown.





junior board puts down pollution

By Francis Licsko
District conservationist, SCS
Greensburg, Pa.

The energies of seven teenage boys and girls are guiding the activities of the first Junior Board of Directors of the Westmoreland County Soil and Water Conservation District in Pennsylvania. The young directors were chosen from various youth organizations in Westmoreland County to assist the district in its conservation, beautification, and antipollution programs.

Richard Kemerer, the junior board's first chairman, sees this new organization as a means of involving young people in community resource problems. "After all," he says, "polluted water, dirty air, sediment-filled streams, and a countryside strewn with garbage affects us as well as adults. We too can help clean up the environment."

The junior board has pushed four major projects this year, and the results have been good. A campaign to clean up Brush Creek at-

tracted more than 100 youngsters. These young people removed tons of discarded cans, bottles, furniture, automobile parts, and household goods from a 2-mile stretch along the stream.

Getting the public acquainted with the Jacobs Creek Watershed Project was the second project. The junior directors built an exhibit to publicize the watershed project at local fairs. They also contacted landowners in the watershed and encouraged them to become cooperators of the Westmoreland County District.

The third project was a county-wide anti-litter campaign, and the fourth was a program to spruce up the conservation district's boundary signs. "We're not litter-free yet," admits Kemerer, "and we still need some landscaping at some of the sign locations, but we have made progress." Kemerer hastens to add, "we have just started to work."



"There is no doubt that the junior board is off to a good start," says Roy Houston, chairman of the conservation district's Board of Directors. "The junior board was organized less than a year ago, and already it has some solid accomplishments. And these young people are planning a number of activities that fit nicely into our overall conservation program."

The junior board offers young people an opportunity to help improve the environment. Those that serve on the board get firsthand experience in organizing programs, in dealing with people, and in developing leadership. They also get excellent training as future directors of conservation districts.

The Greensberg Tribune Review has described the junior directors as "intelligent, capable, and energetic young people who are putting their energies to a useful purpose." ◆

The Junior Board of Directors of the Westmoreland County Soil and Water Conservation District: (seated, left to right) Helen Hart, Greensburg, treasurer; Ken Reed, Derry, vice chairman; Richard Kemerer, Latrobe, chairman; Nancy Stewart, Latrobe, secretary; (standing, left to right) James Meyers, Irwin, associate director; Neil Kinneer, Acme, director; Vincent Brown, Greensburg, director; Rodger Campbell, Derry, associate director; and Richard Hawley, Hunker, director. Missing from the picture are associate directors Susan Greenawalt, West Newton, and Janet Keneny, Export.

A campaign to clean up this creek attracted more than 100 young people.



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and on his farm he had some ducks and crawfish

By Billy R. Craft
Biologist, SCS
Minden, La.

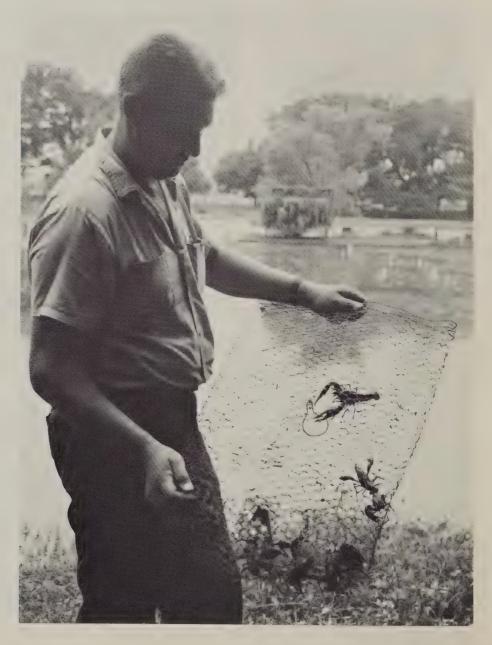
Many landowners in Louisiana have crawfish ponds, and many have duck ponds. Kenneth Prudhomme has a combination crawfishduck pond—a unique dual usage.

Prudhomme is a supervisor of the Lower West River Soil and Water Conservation District in Natchitoches Parish, La. He had 12 acres of low, wet, marginal farmland surrounded by large live oaks in his cattle-cotton operation and asked for SCS help in planning the area for wildlife. The result was a combination crawfish-duck pond.

By installing a flashboard riser

as a water-control structure and two culverts, Prudhomme was able to pump water from nearby Cane River. The water flows through road ditches to the pond. Prudhomme says that pumping costs are low because the same pump used to irrigate cotton on his farm is used to flood his pond.

Crawfish occur naturally in small numbers in Natchitoches Parish, so Prudhomme went to Breaux Bridge, La., the crawfish capital of the world, and bought 600 pounds of red swamp crawfish to stock his pond. The crawfish currently being



harvested from Prudhomme's pond are nearly twice the size of those in the original stocking in 1968. The increased size can be attributed to the fertile soils of the Red River bottom land.

Crawfish eat dead and living plant and animal matter, but in most ponds vegetation is their main diet. Prudhomme's pond contains smartweed, water primrose, and wild millet. The millet furnishes food for both crawfish and ducks. The large live oaks along the edge of the pond provide an abundance of acorns for ducks.

The hatching period for crawfish peaks in October, and an abundance of water is a critical requirement at that time because young crawfish are free swimmers and start feeding at an early age. Prudhomme floods his pond about the first week in October to a depth of about 18 inches. This helps the young crawfish as well as the ducks that are migrating to Louisiana at this time.

Mallards and woodducks mainly stop over to rest and feed. Ducks are hunted only in the mornings. This allows them to return unmolested in the afternoon. Prudhomme drains the pond late in June after most of the ducks have migrated north. Draining the pond at this time serves two purposes. First, it allows the female crawfish to "dig in" for the summer. Second, draining stimulates plant growth; food for the next year is produced during this time.

The Louisiana Department of Agriculture values the present crawfish industry at more than \$5 million. Prudhomme allows only his family and friends to use his pond, but he could turn it into a money maker anytime he wants.



(Left) Kenneth Prudhomme examines a wire trap to catch crawfish; he uses cut fish as bait. (Above) This crawfish-duck pond replaced a wet, marginal farm area. A duckblind is in the center background.

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erosion controlled on carlot

By Raymond E. Bryant District conservationist, SCS Morristown, Tenn. In spring 1969, Lon F. Price of Morristown, Tenn., moved his automobile dealership to a new location. Along the edge of a newly paved parking lot was a steep bank that had been neglected during construction. The bank began to erode under spring rains, and soon large gullies appeared. Within a few weeks the lot was being washed away.

After seeking advice from many sources, Price went to the Hamblen County Soil Conservation District and the Soil Conservation Service for technical help. The SCS district conservationist visited the site and recommended protective vegetation and concrete waterways to carry runoff safely from the lot.

In 6 months, part of the area had been stabilized by sodding, and the rest had been smoothed and seeded.

Price has been an affiliate member of the Hamblen County District for several years. Until his erosion and sediment problems came up, there had been no occasion to ask for help. "I appreciate the help and professional advice I received," said Price.

Price has set an example for



others in commercial, industrial, and urban areas by stopping ugly and expensive erosion. He also has added to the beauty of his property and of the surrounding area. The entire community benefits from this kind of conservation work.

Erosion had been eating away at the parking lot before the steep banks were stabilized and seeded. The asphalt-paved drop chutes and the concrete waterway (above, left and right) carry runoff safely off the lot. (Right) Kentucky 31 fescue and ryegrass keep the soil on the slope and out of sewers, storm drains, and streams.



strip mines that don't stay ugly

By Neal P. McKinstry
District conservationist, SCS
Craig, Colo.









- 1. Coal is one of Colorado's natural resources. In northwestern Colorado a good grade of bituminous coal is worth many dollars to the local economy.
- 2. In many places, large draglines make strip mining the most economical method of recovering coal from depths of up to 90 feet. Unfortunately, good farm or range land is destroyed in the mining operation. Subsurface mining is practiced only where thick veins lie deeply buried.
- 3. Giant draglines can turn many acres upside down in a year. Their 40-cubic-yard buckets strip away overburden at a fantastic rate.
- 4. Mining can convert beautiful and productive land into pile after pile of shale and sandstone spoils unfit for any use.
- 5. Largely due to the efforts of the White-Yampa Watershed Association of Soil Conservation Districts, all major coal companies in Routt County agreed to strike off the peaks of the spoil banks to a minimum width of 15 feet and to revegetate the areas.
- 6. Some mine operators went further. This \$100,000 crawler with dozer is used primarily for smoothing out the spoil piles.
- 7. This area is well on its way to restoration. When the depressions are completely filled in, most of the seeding can be done with a drill.
- 8. Grass makes it beautiful. Smooth brome, orchardgrass, intermediate wheatgrass, and alfalfa have successfully reclaimed this area.













a county in transition

By Glenn B. Anderson District conservationist, SCS Fairfax, Va. In Fairfax County, Va., there was evidence of the haphazard large-scale urbanization that brings along with it destruction of scenic areas, excessive soil loss and sedimentation, runaway storm water, and damage to houses.

To put a stop to this deterioration of the environment, the county adopted a number of ordinances and policies to guide subdivision development. The county also took action to get help in land use planning and in developing conservation programs. In 1965, the County Board of Supervisors and the Northern Virginia Soil and Water Conservation District jointly sponsored an application for a watershed project for Pohick Creek.

The Pohick Creek Watershed Project embraces about 32 square miles of land on the fringe of the Washington, D.C., metropolitan area. The creek has three main branches. The watershed's topography is gently rolling to moderately steep; the elevation ranges from 45 to 460 feet above sea level.

This Public Law 566 project is one of the first in the nation to be

planned in a watershed that is expected to be converted entirely from rural to urban use.

This planned conversion is by no means a pipe dream. The construction of public sewers in the Pohick area and the extension of a public water-supply system have been bringing more and more people into the watershed.

The population of the watershed in 1963, when comprehensive planning started, was 5,000. About 15,000 people have moved in since then. By the year 2000, an estimated 161,000 people will be living in several subdivisions around a number of lakes, parks, schools, and shopping centers. At present prices, privately owned real estate with improvements will be valued at \$1.5 billion. The investment of public money in community facilities and capital improvements will total \$107.4 million.

One objective of the project is to restrict or prevent development of flood plains along major streams, adjacent steep slopes, and areas of unstable soils.

Another objective is to control









Two views of Lake Braddock (opposite page), the focal point of a 412-acre subdivision in the Pohick Creek watershed. This 22-acre lake receives runoff from the surrounding areas and is used intensively for recreation. (Above) An effort is made to keep the soil smooth and compact during construction. Nevertheless, until the lots are sodded and the streets paved, runoff will carry some soil downhill. (Left) Conservation measures for the Pohick Creek watershed included this basin which traps the sediment that washes down from the construction site.

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accelerated erosion and sedimentation on construction sites by requiring developers to plan and apply appropriate conservation measures.

The federal government's input for the construction of eight flood-water-retarding structures and for 6.2 miles of channel-improvement work amounts to about \$1 million. In addition, SCS is providing technical help in carrying out the accelerated land-treatment program.

The project sponsors are responsible for getting the land rights, estimated to cost about \$1 million, for works of improvement.

Developers are to pay the cost of land-treatment measures for erosion and sediment control. These will cost about \$3 million.

The land-treatment and structural measures can reduce sediment delivery into Pohick Creek and the Potomac River by 7.2 million tons in the 100-year life of this project.

Controlling erosion and sediment in urban areas means working primarily with public agencies, contractors, developers, engineers, and planners. The techniques and conservation programs are different from those generally used in agricultural watershed projects.

In the Pohick watershed-

- (1) County ordinances and related guidelines and policies were amended to require effective erosionand sediment-control measures for all future developments.
- (2) A combination of land-treatment measures that minimize erosion and sedimentation was worked out, and a handbook of standards and specifications for a variety of conservation practices and measures was prepared.

(3) A continuous program of training, education, and information has been pursued to acquaint representatives of public agencies, developers, engineers, planners, and contractors with principles and techniques of conservation land treatment.

All rezoning applications in the Pohick watershed are referred to the Soil Conservation Service, through the Northern Virginia District, for evaluation before any action is taken by the county.

After rezoning action has been taken, the preliminary subdivision plans outlining the developer's erosion- and sediment-control measures are referred, in the same way, for study and recommendations.

SCS gives technical help to agencies of the county, private developers, groups, and individuals on all phases of the conservation program. On request, SCS gives onsite technical advice on applying conservation practices called for in the approved plan.

The Pohick example shows how a watershed project can complement an overall resource-development program and how conservation practices are made a working part of subdivision plans.

loblolly pines

Ten young men from Columbia County, Ga., lost their lives in World War II, but they have been remembered by the land from which they came.

In 1944, G. B. Lambkin, supervisor of the Little River Soil Conservation District, suggested a memorial for these men, and Jack Eubank, a district member, thought of loblolly pine trees. Families or friends donated an acre of land for each of the men. In 1945 the Little River District supplied the trees.

One of the tallest memorials is about 4 miles from Appling. There a grove of 60-foot loblolly pines

surrounds the grave of Charles Snellings. About 1,000 trees were planted on this site, and 95 percent have survived.

Most of the men's families have placed stone plaques on the graves. Each plaque has engraved on it the young man's name and company and "Pines are a living memorial."

J. C. Butler, SCS district conservationist, often checks the pine tree groves although the families of the men maintain them. Most of the trees have lived longer than the men for whom they stand tall.—GRACE KRUMWIEDE, Information Division, SCS, Washington, D.C.

sharing is half the fun

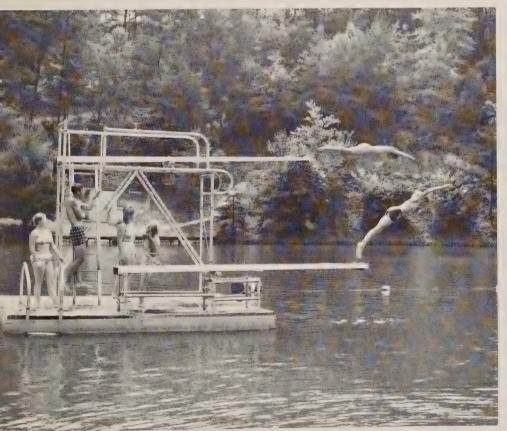
What began as a place for relaxation for three men and their families has evolved into a recreation complex that is available to about a quarter of a million people.

Because of inadequate facilities for outdoor recreation in upper east Tennessee, Albert Buchanan, Ogden Shook, and Clarence Carrier bought 85 acres of land to develop for their own recreation needs. But they didn't stop there; they kept on buying more and more adjoining land until they had 295 acres.

It was at this point that the three landowners decided to expand their facilities so that others might use them as well.

Buchanan asked the Sullivan County Soil Conservation District and the Soil Conservation Service for technical help in determining the feasibility of building a lake. The district conservationist, after making onsite soil investigations, prepared a design for a dam 20 feet high that could impound a 6-acre lake.

The recreation facilities at Underwood Park are accessible to a quarter of a million people in upper east Tennessee.



SCS helped develop a conservation plan for the entire 295 acres. The plan included provisions for woodland improvement and wildlife development. Roads were located where they could serve as firelanes to protect the wooded areas.

Following SCS specifications, the partners installed the principal spillway for the lake, built 3 miles of roads to completely encircle the lake, and beautified the shoreline.

They completed two sand beaches that accommodate about 700 people, installed diving boards and floats, and opened the area to the public (after the State Health Department gave its approval). Lifeguards are on duty at all times.

The lake has been stocked with bass and bluegill. Ten boats, complete with life-saving equipment, have been added for sport fishing. A modern bathhouse and concession stand have been built to accommodate swimmers.

Picnickers have access to 25 tables in a shaded area along a clear mountain stream. The picnic area is complete with grills and waste cans.

Cabins, equipped with the latest conveniences, have been built on a wooded hill overlooking the lake. In an area developed for about 50 campsites, there are tables and grills, a central bathhouse, and parking for about 300 cars.

And the newest attraction is a miniature golf course.

"About a quarter of a million people live within 25 miles of our facilities," said Carrier. "We want to preserve the natural beauty of the area and at the same time give the people the kind of recreation they want."

The entire area is in a setting of beautiful wooded hills and valleys. It is framed by the Holston Mountains, which are part of the Appalachian Range. The hardwoods and evergreens and the many flowering plants natural to the Appalachians make this area ideal for nature study as well as for recreation.—H. C. Green, district conservationist, SCS, Blountville, Tenn.

the land from which a church grew

Who ever heard of a church winning a "tree farm" award? People around Ringgold, La., have.

Springhill Baptist Church, near Ringgold, is a winner of the Louisiana Forestry Association's Tree Farm Award. The church owns 40 acres of trees in its backyard—trees that have helped pay church bills for nearly 100 years, according to Everette Geis, the pastor.

Springhill Baptist Church was organized in 1870. The first church was built on a rocky, hilly site—part of 40 acres given to the church by two members of the congregation, Cul Conly and Everette Hamner.

Church members cut trees from part of the land to build that first church, a log cabin that was used until 1880.

By 1928 the old church was badly in need of repair. Horace Boise, a deacon of the church and a member for more than 60 years, remembers that \$1,000 was borrowed that year for repairs.

"Several church members pledged half a bale of cotton to pay off the loan," Boise recalls. "When members pledged in those days, it wasn't money but part of a crop. If the crop was bad so was church financing. That's the way the preacher was paid too."

"The first year we paid \$600 on that loan," said Boise, "but the next year was 1929, and cotton went down to \$0.05 a pound. We only got \$125 for 5 bales that year. For several years times were hard and money was short."

By 1945, the 40 acres had grown into a pretty good forest. An offer of \$750 was made for the timber. And that was fortunate because Springhill had to build a new church, and money was still short.

Boise said that they wanted to cut the trees right, so the church signed an agreement with the Saline Soil and Water Conservation District and asked the Soil Conservation Service to help plan a conservation program for the woodland.

The timber was marked for cutting in late 1945 under the guidance of Hal Townsend, then SCS woodland conservationist and now professor of forestry at Northwestern State University. Only pulpwood and poles were cut that year because of a labor shortage. Saw timber was cut in 1948. This first cutting netted the church \$1,270. A new cinderblock church was built in 1948, and the timber money was a start in paying for the building.

After the timber was cut, church members culled the woodland so little trees could grow better.

Boise was put in charge of managing the woodland. "We wanted to follow a plan that would not only bring income from the trees but also improve the woodland year after year," he said.

In 1954, the timber was marked and cut again, this time with help from Ford Fallin, then SCS woodland conservationist at Ruston and now in the SCS state office in Alexandria. This cutting brought more than \$1,400, which was used to pay bills.

The woodland was harvested again in 1963 and in 1968; the 1968 sales amounted to nearly \$2,000.

Bill Conly, a member of the church and a forester with the Louisiana Forestry Commission, is now looking after the timber. He figures the timber's worth at about \$150 an acre.

Springhill Church has about 300 members, and the membership is increasing. The annual budget is about \$22,000, and there is a brick home for the pastor and his family. About half of the members still farm the land, but they don't plant cotton. Money comes from grass and trees.—Gene Warren, public information specialist, SCS, Alexandria, La.

Pentagon promotes conservation

Every year one of the nation's largest landowners gives himself an award for conservation excellence.

Who's the landowner?—the U.S. Department of Defense, which manages 20 million acres on 243 bases all over the United States. Under DOD's Natural Resources Program, each Army, Navy, and Air Force base is a cooperator with its local conservation district and carries out a conservation plan with technical aid from the Soil Conservation Service and other agencies.

The Secretary of Defense Conservation Award, presented yearly since 1962, goes to the base showing the most progress in these areas: (1) Fish and wildlife; (2) forest management; (3) soil and water conservation; (4) pollution abatement; (5) outdoor recreation; (6) conservation education and club activities; (7) community relations and public use of base facilities; (8) beautification; and (9) nature trails and nature areas.

A three-man committee drawn from the Departments of Defense, Interior, and Agriculture selects the top base from among six finalists—two from each service. Darnell M. Whitt, director of the Plant Sciences Division, SCS, Washington, D.C., represented the Secretary of Agri-

culture on the committee in 1970 and will do so again in 1971.

The six finalists for this year have already been selected. The award committee is scheduled to visit the six installations beginning June 1. Lloyd Partain, assistant to the SCS Administrator, was one of the judges that selected the Navy's two finalists.

Last year's winner was Camp Pickett of Blackstone, Va. Finishing in a tie for second were the U.S. Air Force Academy, Colorado Springs, Colo., and the Naval Ammunition Depot, McAlester, Okla. The other finalists were Fort Jackson, Columbia, S.C.; Naval Air Station, Patuxent River, Md.; and Pease Air Force Base, N.H.

At Camp Pickett, 1,700 acres that had been cleared for tank maneuvers were planted to food and cover crops to encourage wildlife and prevent soil erosion. Camp Pickett soldiers cleared 800 acres of old fields and woodlands to improve training sites and aid wildlife and reforestation programs. They seeded roadsides and planted shrubs and trees to beautify the post.

Defense of the United States may be DOD's first aim, but defense of its natural resources is high on the list as well.—DANIEL A. PEED, information division, SCS, Washington, D.C.

Secretary of Defense Melvin R. Laird presenting the Secretary of Defense Conservation Award to Col. W. C. McMullin, the commanding officer of the winning base, Camp Pickett, Va. Darnell M. Whitt (left), director of SCS Plant Sciences Division, was a member of the selection panel.



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Benefits and Burdens of Rural Development: Some Public Policy Viewpoints. Edited by Earl O. Heddy. 1970. Iowa State University Press. 311 pp. \$5.95.

This book has some very useful historical figures and suggestions about the problems of supply control and farm prices with special reference to carrying out federal legislation dealing with price support and supplies of certain farm products. The book also presents some current suggestions about the influences of the past programs and related policies on commercial farming.

Yet, on the specific subject of rural development, there is considerable semantic confusion because in most places the words "farming," "agriculture," and "rural" are used almost interchangeably. The arguments are difficult to follow. Years ago "farming" and "agriculture" were nearly synonymous, but that time is long, long past.

Certainly farm labor has been declining. Since the industrial revolution came to agriculture, farm labor has moved to the towns and cities. The farmer probably uses about as much labor as he ever did, but now he uses it in the form of machines, chemicals, oil, electric power, and many other inputs. Although good figures are hard to come by, probably the labor on farms amounts to about 5 percent of the total labor force. Doubtless the labor force in all agriculture is of the order of 25 to 35 percent of the total national labor force.

Several other important sectors of agriculture in addition to farming are highly important. One includes the manufacture of chemicals, machines, oil, electricity, and all the other inputs used on farms. Then too, nearly all of the important processing of farm products has also

moved to towns and cities. The enormous reductions in waste of farm products by modern marketing and processing is one of the most dramatic achievements of American agriculture. In one chapter of this book these sectors are referred to as "agribusiness."

Besides these industrial components, agriculture includes important financial, educational, and research services in both the public and the private sectors.

Further, this book fails to give a glimpse of the enormous variety of the American farm production. Discussion is limited to standard Midwest crops and animals and cotton. Both tables and discussions fail to include any horticultural crops, rice, sugar, forest products, and the many other specialty crops. Nor is there any recognition of the recent increase in horse breeding.

In places too, the book relates the acreage classes of farms to various national summaries and to one another without realizing the enormous ranges of soil and climate that determine their basic productivity.

The area discussions do not bring out the vital functional relationships between rural towns and farming. Of course, the little villages lacking transport began declining with the general use of automobiles during World War I. But those country towns with enlightened leaders and with good transport, including an airport, have been expanding. Some of the later chapters give some hints of the great importance of the distribution of housing and population to have the benefits of good economic, physical, biological, and cultural environments through townand-country planning. Once this type of town development, based on farming and forestry resources, gets going, with the essential infrastructure, then other industries can be attracted to these smaller towns that have much better environments than the old overcrowded cities.

Accelerated progress in this vital area of town-and-country planning is the key to so-called rural development. Further, the principles apply broadly in other countries. Through town-and-country planning, the redundant farm labor in newly developing farm areas can be employed in the industrial sectors of agriculture itself.—Charles E. Kellogg, former deputy administrator for soil survey, SCS, Washington, D.C.

Highway Materials. By Robert D. Krebs and Richard D. Walker. 1971. McGraw-Hill Book Company, New York. 406 pp., illus. \$13.95.

This text has been prepared for the 2-year college level but is excellent for use in short courses and for the review of aspects of highway materials by practicing engineers and technicians. For the uninitiated it should be augmented with lectures and laboratory work.

The authors discuss the principles and conditions that affect the selection and performance of highway materials and give a thorough treatment of the materials themselves and their characteristics.

The four principal materials—soil aggregates, portland cement, concrete, and bituminous mixtures—are covered. The discussion on soils includes the fundamental concepts of soil, air, and water, classification, ground water and drainage, frost action, compaction, and stabilization.

Current practice and tests for each material are presented and for the reader who has greater interest the list of references is comprehensive.

This book is very well prepared and provides an excellent text for a 2-year technician's course and for engineering students in general. I expect it to be of particular value as a refresher for practicing engineers. The discussion is directed to highway construction but is also applicable to other engineering works.—Paul E. Nylander, Engineering Division, SCS, Washington, D.C.

New publications

Norman Borlaug—Hunger Fighter. By Don Paarlberg. 1970. USDA PA 969. 20 pp., illus. A story of wheat, a story of a man who fights the world's hunger and seems to be winning. The story begins in Mexico in 1944 when Norman Borlaug went to that country for the Rockefeller Foundation to improve its agriculture. The breakthrough of the green revolution—a high-producing wheat—came in the hungry part of the world, not in those countries already surfeited with agricultural output.

Basic Statistics—National Inventory of Soil and Water Conservation Needs, 1967. 1967. USDA Statistical Bull. 461. 211 pp. \$1.75. Presents the data of the updated National Inventory of Soil and Water Conservation Needs as of base year 1967. The first national inventory had 1958 as its base year, and the data were published in Basic Statistics of the National Inventory of Soil and Water Conservation Needs, USDA Statistical Bulletin 317, in 1962.

Food Consumption, Prices and Expenditures, Supplement for 1969. 1971. USDA Agricultural Economic Rpt. 138. 83 pp., illus. Revises and updates through 1969 the statistical information contained in Food Consumption, Prices, and Expenditures, issued July 1969.

National Forest System. 1970. USDA Forest Service File 1380 (5400). 20 pp., illus. Lists 154 National Forests, 29 Purchase Units, 19 National Grasslands, 20 Land Utilization Projects, 24 Research and Experimental Areas, and 21 other areas in the United States and Puerto Rico as of June 30, 1970. A map of the National Forest System and related data appear in the publication.

Soil surveys

Eddy Area, New Mexico. By Jack C. Chugg, George W. Anderson, Donald L. King, and LaVaughn H. Jones. 1971. 82 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Erie County, Ohio. By C. E. Redmond, T. J. F. Hole, C. H. Innis, and M. Wachtman. 1971. 166 pp., illus.; maps 4 inches to the mile (1:15,840).

Broome County, New York. BY EDWARD R. GIDDINGS, DONALD F. FLORA, AND GERALD W. OLSON. 1971. 95 pp., illus.; maps 4 inches to the mile (1:15,-840).

Nelson County, Kentucky. BY FRED S. ARMS, JAMES P. FEHR, DAVID T. CARROLL, BYRON L. WILSON, HERMAN P. McDonald, and James C. Ross. 1971. 106 pp., illus.; maps 4 inches to the mile (1:15,840).

Bent County, Colorado. By Rodney E. Preator, Ronald E. Moreland, Stanley O. Woodyard, and M. Bruce McCullough. 1971. 72 pp., illus.; maps 4 inches to the mile (1:15,840).

Champaign County, Ohio. BY ALEXANDER RITCHIE, JR., KENNETH POWELL, AND V. I. SIEGENTHALER. 1971. 82 pp., illus.; maps 4 inches to the mile (1:15,-840).

Walworth County, Wisconsin. By Orville L. Haszel. 1971. 107 pp., illus.; maps 4 inches to the mile (1:15,840). Fieldwork by John M. Cain, Donald W. Owen, Donald C. Kurer, Joseph A. Steingraeber, and Orville L. Haszel.

Meetings

The American Society of Agricultural Engineers will hold its 64th annual meeting June 27-30 in Pullman, Wash., presenting "Solving Environmental Quality Problems in Agriculture" as the theme.

The American Water Works Association will hold its 91st annual conference June 13-18, in Denver, Colo. "Action Now" . . . on improving the quality and quantity of public water supply and effectively publicizing the important job being done by the water-supply industry . . . will be the theme of the conference.

The annual meeting of the National Education Association will be held June 27-July 2 in Detroit, Mich.

"Prelude and Current Status of NEA Concern for and Involvement in Environmental Education" will be highlighted during the meeting. In a question and answer period, "One Way to Go—NEA Project on Environmental Education" will be discussed. "Social and Economic Aspects of Water Resource Development" will be the theme of a research conference to be held June 21-23 in Ithaca, N.Y.

This conference is sponsored by the American Water Resources Association and the Cornell University Water Resources and Marine Sciences Center.

The 88th annual convention of the American Seed Trade Association will be held June 27-30 in St. Louis, Mo.

Dates and places

June

6-9, National Watershed Congress, Tampa, Florida.

6-10, General Federation of Women's

Clubs, Pittsburgh, Pa.

7-9, American Association for Conservation Information, Springfield, Mo.

8-9, National Conference of Federal and State Water Officials, Des Moines, Iowa.

13-18, American Water Works Association, Denver, Colo.

14-18, American Water Resources Association and University of Wisconsin-Milwaukee Research Conference on Planning for Water Quality and Standards, Milwaukee, Wis.

19-25, Outdoor Writers Association of America, Inc., Pensacola, Fla.

20-24, American Society of Landscape

Architects, Portland, Oreg.

21-23, American Water Resources Association and Cornell University, Symposium on Social and Economic Aspects of Water Resource Development, Ithaca, N.Y.

26-30, Air Pollution Control Association, Atlantic City, N.J.

27-30, American Seed Trade Association, St. Louis, Mo.

27-30, American Society of Agricultural Engineers, Pullman, Wash.

27-July 2, National Education Association, Detroit, Mich.

27-July 3, National Environmental Health Association, Portland, Oreg.

July

5-7, Izaak Walton League of America, Long Beach, Calif.

12-17, International Symposium on Useful Wildlife Shrubs, Logan, Utah.

17-21, American Association of Nurserymen, Dallas, Texas.

18-21, National Association of Counties Research Foundation, Milwaukee, Wis

25-29, National Association of Business and Professional Women, Cleveland, Ohio.

29-31, Great Plains Conservation Council, Albuquerque, N. Mex. ◆

Recon...

'Round and 'round they go. "Recycling is the direction we should go. Recycle waste and recycle what we use. Our raw materials are not inexhaustible, nor are air and water . . ."—WILLIAM RUCKELSHAUS, director of the Environmental Protection Agency.

Ritchie County, W. Va., has turned gravel playgrounds (a source of minor injuries to children) at its schools into outdoor classrooms for conservation learning.

School authorities found help readily available from many individuals and groups: SCS planned trails and study areas; a landscape architect from West Virginia University drew up beautification plans; the Parent-Teacher Association took on the job of maintenance.

All public schools in the county now have outdoor laboratories, which range from 1.6 to 400 acres, and 1,600 children use them for conservation education.

As part of Project SOAR (Save Our American Resources), a national conservation service project during 1971, the Boy Scouts of America are highlighting the need for litter cleanup, litter prevention, and recycling in a nationwide activity.

Scouting Keep America Beautiful Day on June 5, 1971, was aimed at both an immediately cleaner environment and litter prevention in the future.

An important objective of Scouting Keep America Beautiful Day was to get across that recycling is an answer to the solid-waste problem. Recycling can solve two problems at one time. First, it gets rid of the trash that may become litter. Second, it reduces the drain on natural resources needed to make the product.

Simpson Jefferson, sixth grade teacher at Madison Elementary School, Washington, D.C., after attending a teachers' class in ecology sponsored by the National Park Service, was determined to improve the environment around his school.

Assisted at first by his sixthgraders and later by the entire student body, Jefferson turned an eroded, litter-strewn embankment at the end of the school playground into an urban environmental study area.

The area is small (70 by 20 ft.), but what Jefferson and the students have done to it has had a large impact on the neighborhood. This effort has instilled in the neighborhood an awareness of environment and how it can be improved. Residents have joined students in making the neighborhood a more pleasant place in which to live.

The Pennsylvania State University College of Agriculture has added Environmental Resource Management (ERM) as a 4-year, undergraduate major. Courses in the biological, physical, and social sciences are combined with technical courses in the College of Agriculture. Ten new courses worked out for this ERM major include: Pollution of environmental systems; ecology of plant production; soil resources and land use; rural water-resource management; and legal aspects of resource management.

The Virgin Islands Legislature has passed and the Governor has signed an Environmental Protection Act. Under this act, development plans must be submitted to the local soil conservation district for review and approval.

Montgomery County, Pa., found 48 abandoned quarries that could be used for sanitary landfills. The old quarries have a combined surface area of 377 acres and a capacity of 20 million tons of solid waste. Considerable work was needed to meet Pennsylvania Department of Health standards—and to get a permit to operate—but the project is underway and should be adequate to serve the entire county for 20 years.

The North Dade Journal of North Miami, Fla., startled its readers when it published an appeal on its front page for dirty pictures. The journal paid \$5 for a picture published on the inside of the paper and \$10 for a "front page" picture. Pictures were to show debris or pollution.

The newspaper identified the area shown in each picture and gave the source of the pollution, if known. This gave readers and the owners of the polluted areas a chance to take action.

In a followup report, the newspaper indicated that a place had been cleaned up or that conditions were being ignored and getting worse.

New towns vs. urban sprawl. The Southeastern Wisconsin Regional Planning Commission figures that scattered development for 15,000 people over a 42-square-mile area needs 23 miles of high-standard roads, 21 miles of sanitary sewers, and 9 miles of storm drains. A planned new town for the same number of people needs 74 percent fewer miles of high-standard roads, 67 percent fewer miles of storm drains, far less sewage construction, and a third less costly elementary school system.



More to do about wastes

If all of America's daily wastes were placed end to end, they would reek to high heaven.

This approximation suggests the gaps that remain in technical knowledge about disposing of or recycling the waste products of American society.

In the agricultural sector, important gains have been made in research and on the land in lessening pollution problems caused by sedimentation, use of agricultural chemicals, animal wastes, municipal wastes, and salinity.

SCS conservationists are helping local conservation districts deal with a broadening range of pollution-abatement work:

- —Erosion control on farmland and along roadsides and streambanks to keep sediment, fertilizers, and chemicals from moving into waterways.
- —Treating animal wastes on the farm through use of lagoons, diversion structures, holding ponds, and irrigation systems for spreading wastes on pastureland, and other methods.
- —Locating good sites for disposing of solid wastes from farm and town, planning erosion control and water-disposal methods to protect the sites, and selecting plants to screen or cover the sites.
- —Controlling soil and water and selecting plant materials to restore surface-mined land and keep acid and sediment from polluting waterways.
- —Devising tailwater recovery systems to keep polluted irrigation water from fouling streams
- —Locating soils and selecting crops that can assimilate sludge from municipal waste treatment and processing plants

—And many other kinds of action.

Working in these areas of pollution abatement requires that SCS people continuously educate themselves in techniques to do a better job. And on the other side of the coin, experience of SCS people in working with landowners and communities is helpful in determining research needs and other sources of needed help.

Serving both these aims is the purpose of a joint ARS-SCS Pollution Abatement Workshop being held this month in Oxford, Miss. The 3-day session, first of its kind between our two agencies, will help us exchange information about research results and field experience and improve the capability of both agencies.

SCS also is conducting a series of workshops for its employees on our experience and responsibilities in the pollution-abatement field.

Our objective is to help recycle as much of America's waste products as possible and to dispose of the rest by the safest methods practicable. More and more communities, having fouled their air and water, are looking to the soil as a "sink" or final destination for wastes. And knowledge of the soil—its capabilities and its limitations—is the province of SCS. Assisting landowners in the protection of soil and water resources is our responsibility.

We will adapt and apply our knowledge to the urgent need for pollution abatement as we have to all other challenges.

Kenneth E. Grant

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keep it clean

In the swine business, it's difficult to keep your property clean and attractive and free of offensive odors—unless you have a lagoon for the disposal of animal wastes.

Mr. and Mrs. Luther Scales of Coweta, Okla., have the first disposal lagoon in Oklahoma built with technical help from SCS and cost-sharing under the Rural Environmental Assistance Program.

The lagoon is designed to take care of the wastes of 100 mature

animals. It is 8 feet deep; the bottom measures 20 x 60 feet.

The Scales say that, even though their lagoon is new and not yet operating at full efficiency, offensive odors on their feedlots have been markedly reduced. And having the lagoon has reduced the time required to clean the barns and feedlots.

The swine enterprise on the Scales' farm has been improved and refined considerably over the years. Better feeding and better breeding were two changes that were made early. Scales stated that after a few years of attempting to expand his hog operation it became clear that he needed to shift his efforts toward modernization and automation. Late in 1962, with financial help from the Farmers Home Administration. Scales built a modern farrowing house and a combination loafing shelter and concrete feeding platform.

By extending waterlines from the well to the hog barns, Scales was able to install automatic watering devices. Automatic feeders also are standard equipment now as are heat lamps and farrowing crates. This modern equipment has enabled the Scales family to more than double their hog production without increasing labor requirements.—Dan Robertson, district conservationist, SCS, Wagoner, Okla.

This waste-disposal lagoon is on its way to full efficiency. The pit will be filled with water after the area is sodded and fenced.



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July 1971, Vol. 36, No. 12

This month SOIL CONSER-VATION reports on some results and benefits of land use planning. Beautiful Hawaii, featured on our cover, has pioneered in many approaches to land use planning. Its unique statewide Land Use Law requires that every bit of landpublic and private, good and bad, hillside and shoreline. farm and city—be given one of four classifications: urban, rural, agricultural, or conservation. The object of the law is twofold: to preserve prime agricultural land that otherwise might be lost forever to urban encroachment and to provide an adequate land reserve for economic growth.

The lead article tells how planning and conservation practices helped preserve the natural setting at a housing development in West Virginia. Iowa's pace-setting erosion-control law is discussed in an article by Iowa's state conservationist, Wilson Moon. And the centerspread has an article about sanitary landfills in Ohio.

COVER: Shopping centers and highrise hotels have changed downtown Honolulu. Diamond Head, in the background, is an unchanging sentinel over Waikiki. (Photograph courtesy of Hawaii's Department of Planning and Economic Development.)

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 "Doing our thing" in the planning process

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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The Greening of a Subdivision

by James H. Canterberry District conservationist, SCS Charleston W. Va. Thousand Oaks is no ordinary housing development. Attention to little things often overlooked—grass, trees, the control of runoff—makes it more pleasant than most.

This subdivision nestles among the hills of South Charleston, W. Va., one of the world's chemical centers. Residents of Thousand Oaks can live in harmony with their natural surroundings.

Z. G. Huffman and Sherman Huffman started this development in 1960 with 18 acres of land. Today they have 86 acres and have built 100 of the planned 300 houses.

The Huffman brothers recognized that their land had severe limitations for the intended use. The steeply sloping land receives an annual rainfall of 45 inches creating a potential for severe erosion.

The banks of newly graded streets presented one of the first erosion problems. The Huffmans went to the Capitol Soil Conservation District for help. E. T. Estlack, then the Soil Conservation Service's district conservationist helped revegetate the banks. He recommended a seed mixture of crownvetch and tall fescue with fertilizer and straw for mulch.

The Huffmans decided to grow their own crownvetch because sources were scarce. They sowed \$600 worth of seed on their farm, and today they can use either crowns or seed. Planting of crowns speeds the establishment of cover.

Roadbanks now have a good

stand of vegetation almost by the time the concrete pavements are poured.

The Huffmans are experienced builders with an appreciation for nature, but they also know the importance of trees in controlling erosion. Consequently, they disturb trees and other native vegetation only where necessary when excavating for foundations.

"Why destroy trees?" asks Z. G. Huffman. "They are so valuable to a housing development, and it took nature 50 years to grow them."

The Huffmans also reduced erosion and prevented land slips by fitting the house design and land-scaping to the terrain, thus disturbing less soil.

The Huffmans use channel-tile drainageways to cope with runoff. Tile is laid across the slope behind the house to intercept runoff. From there the water flows to another drainageway that carries it safely down the slope to a street or storm sewer.

The developers also install foundation drains to carry off underground water.

Homeowners in Thousand Oaks are encouraged to maintain the runoff-control practices and dense stands of sod. The Huffmans give each owner all the crownvetch seed and crowns he can use.

Residents of Thousand Oaks are aware of and grateful for the attention given to preserving nature.

Mr. and Mrs. Matt Matson be-





lieve that the subdivision offers what most modern developments don't. "Thousand Oaks is a little bit of country right in town," Mrs. Matson said. "Here my children have what my husband and I cannot buy them—a close association with nature and its wonders."

Mr. and Mrs. Philip Angel, Jr., selected Thousand Oaks because the natural setting had been preserved. "Our home would be just a nice box anywhere else," they claim.

Lessons learned at Thousand Oaks have benefited the community and the state. As a member of the South Charleston Planning Commission, Zack Huffman spearheaded the effort to get erosion- and sediment-control standards in the city's zoning ordinance and subdivision regulations. South Charleston was the first municipality in West Virginia to have erosion- and sediment-control regulations.

Huffman was instrumental in the planning commission's signing of a memorandum of understanding with the Capitol Soil Conservation District. The memorandum, an agreement to work together to conserve and develop natural resources, was the first of its kind in West Virginia between a city planning commission and a soil conservation district.

"The best investments I make in my housing developments are those for erosion control," Huffman said. "Green grass and attractive surroundings are my best salesmen." ◆

(Top) Developer Z. G. Huffman seeds all roadbank cut-and-fill slopes and other bare areas with a mixture of crownvetch and Kentucky 31 fescue to reduce erosion and to make his subdivision more attractive. (Bottom) Huffman, on the right, and SCS soil scientist Dale Childs examine a channel-tile drainageway that carries surface water to the street.

Eufaula, city with a past

by C. F. Lyle Project coordinator, SCS Ozark, Ala. Eufaula is a historic city that appreciates the past but is building for the future. This old river city in Barbour County, Alabama, has a beautiful 45,000-acre lake that serves as the catalyst for new developments.

The lake is behind a huge dam on the Chattahoochee River. It is known as Lake Eufaula in Alabama and Lake Chattahoochee in Georgia.

Like many other cities in the old South, Eufaula was a bustling river town in the "plantation era." When the agricultural economy changed, so did Eufaula. Business declined, and people moved away.

But today, Eufaula is a thriving city of 11,000 people. Its appearance and the attitude of the townspeople have brought in more than 30 manufacturers which employ about 3,000 workers. Two mining companies—bauxite and brown iron ore are both abundant in the area—employ about 200 people and add more than \$1 million every year to the economy of the Eufaula area.

Because of the new industries and an almost unlimited potential for recreation developments, young former residents have begun to return to Eufaula.

When the U.S. Army Corps of Engineers moved into town and began planning the giant reservoir that would make Eufaula a seaport town, a few enterprising individuals saw an opportunity for the town to grow and develop. Where cotton had been king, they saw recreation and industry as masters of the economy.

The Soil Conservation Service, in cooperation with other USDA agencies in the county and the Barbour County Soil and Water Conservation District, appraised Barbour County's recreation potential. Eufaula and the Barbour County area were shown to have excellent potential for several types of recreation enterprises. Of 11 types of recreation appraised, five were rated "high potential." Also, the appraisal listed 13 natural scenic and historic areas and identified 11 sites

where lakes could be built ranging in size from 300 to 5,000 acres.

When the Wiregrass Resource Conservation and Development Project began operations in 1967, Eufaula asked for help in developing a major recreation complex on Lake Eufaula. The project sponsors endorsed the application and assisted in locating technical and financial help. Today, a major regional state park is under construction on Lake Eufaula, just 5 miles north of town. It will be known as the Albert P. Brewer Lake Point Resort and is one of only four such parks planned for the state. The master plan for the park includes an 18-hole championship golf course, a marina, beach, lodge, cabins, nature trails, and camping and picnicking areas. The park is estimated to cost more than \$8 million; it will be financed by state and federal funds. SCS provided soils information for the park site.

The Barbour County area already boasts of a wide array of recreation activity, including all forms of water sports. The fisherman can find some of the best bass and crappie fishing in the South. Fishing is also good for bluegill, shellcracker, and cat-fish.

Three major events highlight activities on Lake Eufaula every year. In May there is the Alabama Fresh Water Fishing Rodeo—it takes at least an 8 pounder to place. In July, Tom Mann, Eufaula's own professional bass fisherman, serves as one of the hosts for the Lake Eufaula National Bass Tourney. Not only is Mann a nationally recognized fisherman, but he is also a nationally recognized manufacturer of artificial fishing lures. And, there is the Lake Eufaula Festival in August, which features international boat races, a sidewalk art show, square dancing, and a beauty pageant. Last year the festival drew more than 50,000 visitors from 22 states. Thousands of dollars in prizes are up for grabs each year during the Lake Eufaula activities.

For the heritage-conscious, the



annual antebellum house tour and antique show in April is a highlight. Held amid the beautiful dogwoods and azaleas that line the city's broad streets, this event attracts thousands of visitors from throughout the United States and foreign countries.

The house tour developed somewhat by accident. In 1965, Eufaulians became concerned about the many historic old landmarks that were being destroyed to make way for new buildings. When their most impressive residential showplace went on the auction block, they decided it was time for action. Interested citizens bought the old house, known locally as the Shorter Mansion, for \$33,000 and pledged \$50,000 toward preserving it. Today it houses the Eufaula Historical Museum and is the headquarters of the Eufaula Heritage Association. The beautifully furnished house-museum is now debt free, reports Joel Smith, president of the Heritage Association and editor of the Eufaula Tribune.

Although Eufaula is rapidly becoming an industrial and resort city, its economy is still greatly influenced by the agricultural output of the surrounding rural areas. More than 50 landowners in the Eufaula area have developed conservation plans, covering almost 35,000 acres, with the Barbour County Soil and Water Conservation District. According to Ed Grant, district chairman, these farmers have applied more than 275 conservation practices during the last 8 years.

"Planning, cooperation, determination, and action put Eufaula on the move," says John Dismukes, a county commissioner and member of the RC&D steering committee. "The combined preservation of some old historic manmade resources and the development of our natural resources proved to be a winning combination." A

combination." ♦

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The Shorter Mansion (above) was saved from destruction by heritage-conscious citizens. It is now open daily as a museum and is the headquarters of the Eufaula Heritage Association.

Tom Mann (left), Eufaula's professional bass fisherman, displays the product of his talent. Fishing is a major attraction at Lake Eufaula.

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lowa passes erosion-control law

by Wilson T. Moon State conservationist, SCS Des Moines, Iowa Iowa landowners who don't take steps to prevent erosion may face contempt-of-court charges.

A new law—described as the most far-reaching soil conservation law in the country—went into effect on July 1. It requires that landowners, urban and rural, whose soil loss exceeds certain limits employ erosion-control measures. Landowners are to be given time to reduce erosion to an acceptable level.

According to William Greiner, director of the State Department of Soil Conservation, there are not likely to be any test cases until soilloss limits are established.

A provision that state or federal funds must be available to pay 75 percent of the cost of permanent soil and water conservation practices, such as terraces, may also delay enforcement. But proponents of the law, including Dale Cochran, a member of the Iowa House of Representatives who has pushed for the law since 1965, are enthusiastic and expect to get needed funds.

Another reason backers of the law are confident it will be enforced is the near-unanimous approval it got in the Iowa legislature after being turned down twice in previous years. The bill passed the House 92 to 4 and the Senate 41 to 5.

In signing the bill, Gov. Robert Ray praised it as a strictly non-partisan act and commended Iowa lawmakers for their concern for the environment. Governor Ray had backed the bill from the beginning.

Farm organizations had strongly opposed original drafts of the bill but did not fight the bill in its final form.

Harold Higgins, farmer and president of the Iowa Association of Soil Conservation District Commissioners, gives a Wallaces Farmer poll much of the credit for the unanimous approval of the bill. "Many people think of Iowa farmers as the most conservative people there are," Higgins says, "but in that magazine survey three-fourths of the farmers contacted were in favor of this bill."

Cochran says that the bill came about as a result of the legislature's appointing a 10-member committee to study existing drainage laws and recommend changes. The committee, after holding hearings throughout the state, concluded that (1) existing drainage laws needed to be amended and (2) a new law was needed to coordinate drainage, flood control, and soil erosion problems within the entire area drained by a stream.

The idea of mandatory conserva-



tion which the committee recommended to the 1969 and 1970 legislatures was strongly opposed. Provisions that were protested most were (1) too little cost-sharing from state and federal governments, (2) tough penalties (a farmer could be jailed immediately, or the district could apply conservation measures and put a lien on the land if the farmer did not pay), and (3) a 1-mill tax levy to administer the program.

The law is called a conservancy district law. It sets up six conservancy districts, which take in the entire state, on a watershed basis to coordinate efforts of drainage districts and soil conservation districts and to help put into effect the comprehensive statewide water-resources plan. Soil conservation districts are required to adopt regulations setting soil-loss limits. Because Iowa cities and towns are included in soil conservation districts, sediment and erosion from urban property and highway construction sites as well as from agricultural land will be subject to district regulations.

Fred Cherry, chairman of the State Soil Conservation Committee, thinks that the law will encourage much more voluntary soil conservation. "I don't expect too many neigh-



bors to bring action against each other," Cherry says.

Anyone whose land is damaged by sediment can file a complaint. This means that the State Conservation Commission, for example, can file complaints to keep state lakes from filling with sediment.

House majority leader Andrew Varley doesn't expect many people

to be brought to court either. "But the law does point out that more and more we are realizing everyone has a responsibility to stop erosion," he says.

The law is new, and most backers agree that it is only a start. But it's a move that will materially strengthen Iowa's going conservation program.



(Far left) If erosion from a housing development exceeds the soil conservation district's soil-loss limit, the landowner may be compelled by the courts to apply erosion-control practices on his land. (Left) The objective of lowa's erosion-control law is to stop erosion by any means; seeding is one means. (Above) Under the new law, if a farmer is forced to build permanent structures such as lerraces, 75 percent of the cost must be paid by the government.

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Plantation profits from conservation planning

When an old, misused plantation is turned into productive cropland, excellent pastures, a sportsman's paradise, a place for recreation and for lakeshore living—that's good land use.

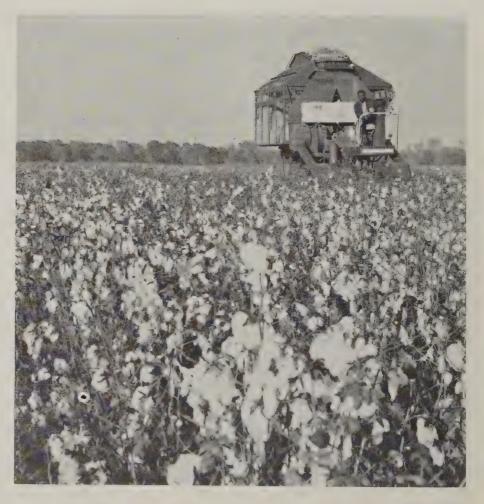
"This land conversion is a success largely because of conservation planning," says George R. Bagley, owner of the 650-acre plantation in Tensas Parish, Louisiana. Bagley is vice-president of the National Association of Conservation Districts.

Bagley is also part owner of 1,650 acres that adjoin his plantation. Of this land, which is controlled by the Lake Bruin Development Corporation, 1,300 acres are in crops and 850 in pasture; about 89 acres have been developed for wildlife, 75 for recreation, 210 for housing, and 23 for an airstrip that serves St. Joseph, 5 miles away.

Bagley started farming his land in the 1930's and immediately had problems. He laid out the farm in square fields—the way it is done in his native Indiana. He soon learned that this method does not work on the rolling, uneven ridges and swales of Mississippi Delta land.

He became a cooperator with the Tensas-Concordia Soil and Water Conservation District and with help from the Soil Conservation Service set out to develop a conservation plan and to rearrange his fields. A soil survey helped explain why cotton, beans, and other crops grew better in some fields than on others. Bagley says he had some oddly shaped fields because fences and field boundaries were determined by soil type. Crops were put on higher, loamy soils and pastures on wet, clayey soils.

Bagley has installed most of the needed conservation practices and a water-management system. Before he plants wheat and Singletary pea cover crops in the fall, he deep-



plows the land to break up a hardpan that forms 8 to 12 inches below the surface. Cover crops are grazed until March when they are plowed under, and cotton is planted in April and beans in May. Cotton yields are about 2 bales an acre; equipment can work in the cottonfields without bogging.

Pastures produce enough grass on each 3 acres for two animal units. The pastureland is divided into 12 fields, which are grazed by four herds of 450 Hereford cows. Cattle are rotated from pasture to pasture about every 2 weeks to give grasses time to recover. Water is supplied to each field from wells and ponds.

Bagley took over the management of the Lake Bruin Development Corporation early in 1960. Because of high inheritance taxes, crops and pastures did not bring enough profit to meet the high mortgage payments on the land. Soil surveys showed that property on the banks of a

3,000-acre lake would make good housing sites and that septic tanks there would work well. Bagley and his partner, James Reed, decided to develop 6 miles of the lakefront for housing sites. The first lots were sold in 1966. There are now 175 lots plotted, and 160 have been sold. Plans are to develop 60 acres for 120 more lots.

More than 40 houses are already built. A shopping center, marina, and a motel are planned, and an application has been submitted to the Economic Development Administration for a federal grant to build a fine-arts center on 50 acres donated by the Lake Bruin Development Corporation.

To keep soil out of the lake, all of the lots are graded and seeded with grass before they are sold. Drainageways are shaped and sodded for beauty and erosion control.

The 75-acre site for a golf course

was selected because the soils there are not suited for crops but are ideal for a golf course. The land is rough and is about 800 feet from the lake. A clubhouse has been built; more than 224 families belong to the club.

Two areas of about 60 acres were developed for wildlife. Browntop-millet is planted in summer, and birds feed on the seeds in fall and winter. Water usually stands on these fields during winter, making them ideal for ducks. Thirteen other wildlife areas—each is 1 acre in size—are located throughout the property. These are fenced and planted with food for dove and quail.

The way George Bagley sees it: good planning and proper land use and treatment are the only way to make high-priced and high-taxed land pay. — GENE WARREN, JR., public information specialist, SCS, Alexandria, La.



(Left) Conservation treatment and planning according to soil capability brought this land to peak production. (Above) The soils here are not suitable for crops but are ideal for a golf course.

A Sanitary Landfill Can be a Good Neighbor





by Marvin F. Bureau Soil scientist, SCS Wooster, Ohio

Sanitary landfill has become a household word to many Ohioans. Almost daily they learn from news media that another nearby open dump has been closed by the local Department of Health. In light of today's emphasis on pollution and ecological control, traditional, antiquated, and unsanitary forms of refuse disposal are rapidly being replaced by more acceptable methods. Many Ohio communities favor sani-

tary landfilling over other approved, but more costly methods of solid-waste disposal, such as incineration and composting. In a sanitary landfill, solid refuse is compressed and covered daily with 6 inches or more of compacted earth.

A thorough evaluation of each proposed landfill site is necessary before operational planning can begin. The Soil Conservation Service cooperates with the Ohio Department of Health in making onsite soil evaluations throughout the state. On request, SCS soil scientists and district conservationists recommend practices for erosion control and

water disposal at a landfill site.

The Ohio Department of Health rejects some sites because of unsuitable soil material or because of pollution hazards to both surface water and ground water.

Soil properties must be considered because they affect the design and operation of sanitary landfills. Other important factors considered in selecting landfill sites include hauling distance, accessibility, kinds of nearby developments, public acceptance, preserving the quality of the surrounding environment, cost of land, and planned use of the area after it is filled.







Once a landfill site is acceptable to the Ohio Department of Health, the next step is to prepare an engineering plan. This plan gives the approximate volume and kinds of solid wastes to be disposed of and the exact methods for operating the landfill. It includes contour maps of the site in its present and future condition and details for overcoming potential pollution of ground and surface water.

If the Division of Engineering of the Ohio Department of Health approves the engineering plan, the local board of health issues a license for development and operation. The landfill operates under continuous health department inspection.

Some sites may need a disposal system for runoff from the area, or upland water may have to be diverted around the site. Vegetation barriers or a screen of trees and shrubs may be needed to obscure the operation from public view.

Once filled, most disposal areas can be put to another use, such as athletic fields, parks, playgrounds, parking lots, wildlife areas, a golf course, or some types of farming. Whatever the eventual use, the reclaimed landfill area generally becomes an asset to the community. •

Once a landfill, always a landfill? No. This landfill (far left) has been reclaimed and turned into a recreation area for Boy Scouts. Open dumping (center) is unsightly, attracts rats and insects, pollutes water—and it's against the law in many states. The trench method of sanitary landfilling (top) is best adapted to level, open areas. The area to the right of the trench has been filled, and reclaiming has begun. Some strip-mined areas (above) make good sites for sanitary landfills.

Taming a mountain

Have you ever tried to tame a growing mountain, improve its looks, and keep it from catching on fire or running away? Russell Stein has. That's his job.

Stein is a mining engineer for the Jones & Laughlin Steel Company in Fayette County, Pa. The mountain is a pile of mine spoil.

It's not an easy job, Stein will tell you. The pile of mine spoil is more than 100 feet high and covers 125 acres. The material is loose; much of it is very fine and is carried away during a heavy rain. Deep canyonlike gullies wash out easily on the side slopes, giving the pile a desolate look.

Every day 5,000 tons of new waste is added to the pile. This waste comes from the company's plant which processes coal from nearby mines for shipment to the mills in Pittsburgh. The waste, which amounts to about 25 percent of the plant's total output, is delivered to the pile by a mile-long conveyor belt. A stacking system and dozers are used to level off the refuse, creating a huge plateau on top of the pile.

For the past 20 years, the Jones & Laughlin Steel Company has used a series of collection basins and diversions to keep the eroding waste out of the Monongahela River and the nearby community of LaBelle. Runoff is directed into the basins within the pile where it gradually filters through the waste and into the soil.

Large diversions ring the base of the pile and collect the runaway waste material. Periodically, the diversions and basins are cleaned or relocated because of the high rate of sedimentation.

Stein has turned to vegetation as an added measure for protecting the pile from runoff and erosion. He feels that vegetative cover will be more economical and will reduce the possibility of the material igniting. There is no doubt it will improve the pile's appearance.

Stein got started on his vegetative program soon after the steel com-

pany became a cooperator of the Fayette County Soil and Water Conservation District. With the help of Riggs Harwell, the SCS district conservationist, he started a series of trial plantings on 6 acres of spoil. More than a dozen different grasses, legumes, and shrubs were tried the first year. Fertilizer and heavy applications of lime were applied because the waste is high in acid and is almost devoid of basic minerals.

During the second year, plantings were tried on 10 acres of spoil. The entire area was limed and fertilized and ditched on the contour. The ditches, which are about 15 inches deep and 20 feet apart, intercept runoff, thus reducing erosion and allowing more water to enter the waste.

Stein and Harwell are planning another series of trial plantings. They are evaluating the earlier plantings to determine which ones show the most promise for vegetating the spoil. So far, black locust, bristly locust, and European Alder look good, but the plantings are much too young for final evaluation.

"Our trial plantings are only a beginning," Stein admits. "But it's a beginning that offers hope for taming this mountain." — CHARLES SLATON, public information officer, SCS, Harrisburg, Pa.





(Above) Diversions at the base of the minespoil pile intercept runoff and runaway waste material. (Left) Vegetation not only has improved the appearance of this minespoil pile but also has kept the material from running away. The experimental planting in the foreground is black locust.

Fairground bids farewell to erosion

What is a county to do when its fairground is eroding away? Monroe County, Ohio, went to sponsors of the Buckeye Hills Resource Conservation and Development Project for help. Monroe County is one of five southeastern Ohio counties covered by the project.

Because the aim of RC&D projects is town-and-country economic development, the Monroe County Agricultural Society, locally known as the Fair Board, believed it could get RC&D help to solve the serious erosion problem at the 37-acre fairground.

Over the years the fairground had been enlarged by leveling sloping areas and bringing in fill where needed. Runoff dropping off the edge of the flattened areas formed gullies. Land slips were common. The annual cost of filling the gullies, repairing the slips, and regrading roads was estimated at \$900.

The SCS district conservationist at Woodsfield, the Monroe County seat, showed the Fair Board how a planned water-disposal and erosion-control system would be nearly maintenance free. And the annual cost of these improvements would be less than the cost of maintenance without the improvements.

SCS helped the Fair Board work out a plan that included grassed waterways, diversions, drop inlets, tile drains, seeding, and improvement of existing vegetation to move runoff safely off the fairground. About \$2,400 in RC&D funds were allocated to this project.

The project was completed in 1969, but it was only the beginning. The Monroe County Commissioners and the County Engineer's Department donated material for an improved entrance and

roadways at the fairground. They also provided a grader, end-loader, and trucks to help in reshaping the eroded areas, moving fill material, and constructing grassed waterways and diversions. Backhoes provided by the county and Woodsfield were used to install drainage measures.

Flowers, shrubs, and trees were planted to further beautify the area. Sixteen native flowering dogwood trees were given to the fairground beautification program. These trees were planted by the individual board members along the approach to the main building.

An unused part of the grounds is to be converted into a picnic area so more people can enjoy the fairground. A new identification sign has been put up at the main gate. Many of the buildings have been painted, and some have been remodeled inside. Even the concession stands have been painted and improved. The Coulson Building was painted by the 4-H junior leaders of the county.

At the last annual county fair attendance was larger than ever. There were more and better exhibits at the fair than ever before. More people came from greater distances than ever to see the new look and the new fair.

The fairground is located just outside Woodsfield and is used for many activities besides the annual fair. Family reunions, picnics, racehorse training, a county Fourth of July celebration, baseball games, and many meetings are held at the fairground, making it a community asset.—Karl H. Reinhardt, assistant area conservationist, SCS, Athens, Ohio, and Neal C. Beery, district conservationist, SCS, Woodsfield, Ohio.

Grass rescues rail research

Grass seeding and mulching seem unrelated to building a railroad, particularly one having a curve, bank, spiral, and base for high-speed, futuristic, linear-induction powered trains.

Because of soil conditions at the Department of Transportation's High Speed Rail Test Site near Pueblo, Colo., officials foresaw the possibility of a severe erosion problem. They feared that the 2-foot high "reaction rail" between the tracks for powering the experimental trains would act like a snow fence and stop the soil that drifted across the track.

Soon after engineers started surveying the site, John Hamernick, regional landscape architect for the Denver office of the Federal Highway Association, contacted the Turkey Creek Soil Conservation District to get help in combating erosion by establishing grass on soils bared by construction.

The soils on nearly half of the DOT test site are deep, dunelike, fine sandy soils of the Valent series. They are unstable and highly susceptible to wind erosion. The rest of the area has deep, gently undulating, moderately sandy soils of the Vona series and deep, nearly level sandy clay loam soils of the Olney series.

SCS personnel studied soil maps of the area, consulted specialists at the SCS Plant Materials Center in Los Lunas, New Mex., and then tailored seeding, fertilizing, and seedbed recommendations to each kind of soil that the track would cover in its 22.4-mile oval path. In fact, the written recommendations became the contract specifications for treatment of the soils disturbed and bared by construction.

The grass was seeded with a grain drill especially modified for seedings of this type. Only certified seed was used. Native hay was spread over the seeded area and crimped 2 or 3 inches into the soil with a disk-type implement.

The effectiveness of the hay mulch was proved on a day when the prime contractor chose to shut down because winds in excess of 60 miles an hour were causing unusual hazards to workers. "I expected to see that ground swept clean the next morning," said Don Taylor, project engineer. But the crimped-in mulch held and kept the soil in place almost as well as growing plants.

According to Charles Miley, resident engineer on the DOT project, about 1,000 acres will eventually be seeded. The success of the seeding, of course, will depend on the moisture available.—Roy J. Larsen, soil scientist, SCS, Pueblo, Colo.

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BLM and SCS continue interagency planning

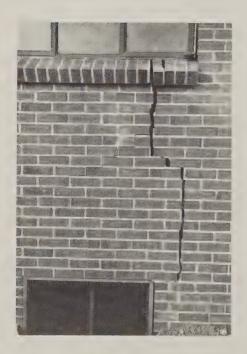
Cattle and sheep ranchers who operate on both federal and private land should receive more timely and efficient help from federal agencies as a result of a new Soil Conservation Service-Bureau of Land Management agreement.

Boyd L. Rasmussen, director of Interior's Bureau of Land Management, and Kenneth E. Grant, administrator of Agriculture's Soil Conservation Service, announced that they have signed an agreement calling for improved coordination between BLM's grazing allotment planning and SCS's ranch unit planning. The new agreement updates and revises planning procedures for a program of interagency cooperation that began in 1965.

Purpose of the agreement is to give more help to conservation district cooperators in resource management and improvement, reduce procedural details, provide new program-planning guidelines, and place more agency responsibility at the state and local levels.

BLM administers grazing use on more than 170 million acres of public land throughout the western states. The Soil Conservation Service gives technical help to private landowners in planning conservation programs on their land in 3,000 conservation districts across the nation. The agreement makes it possible for the two agencies to coordinate programs in areas of mutual interest.

Soil maps lead to right decisions



Maps showing soil limitations are an invaluable aid in town-and-country planning. Since 1964, Adams County, Colorado, has made extensive use of such maps in making land use decisions.

In 1964, Adams County Commissioners requested help from the West Adams Soil Conservation District in developing interpretative maps showing soil limitations for such uses as light industry, house sites, septic-tank absorption fields, sewage lagoons, roads and streets, gravel and sand, and agriculture.

Under the guidance of an SCS soil scientist, draftsmen in the county planning office prepared nine maps based on the Adams County soil survey. Each map covers one township at a scale of 4 inches to

Damage to houses can be avoided if the builder checks the soils before he builds.

the mile. Seven color interpretive maps were made of each township showing three degrees of soil limitation for seven different land uses.

Because the maps are on a plastic mylar base, copies can be made easily and inexpensively, making soil interpretations readily available to anyone needing this kind of information.

Roman V. Bockus, Director of Planning in Adams County, believes that some developers in the county would not have made the mistakes they did if these maps had been available several years ago. He says, "In some areas, badly cracked basements, nonfunctioning septic-tank sewage disposal systems, and roadways needing almost constant repair are a major headache to owners, developers, and planners.—CHARLES DAVIES, district conservationist (retired), SCS, Brighton, Colo., and HARRY FUKAYE, president, West Adams Soil Conservation District. •

SCS serves faraway places

Imagine a country the size of Florida, that looks like western New Mexico, and has the climate of Southern California. That's Tunisia.

Imagine a soil scientist who comes from the state of Washington, has 35 years of experience with the Soil Conservation Service, and speaks some Arabic. That's Sanford (Sandy) Anderson.

Sandy, who retired in May after 7½ years in Algeria and Tunisia, was the "longest abroad" employee in SCS. For the last 5½ years he worked in Tunisia, first on the Oued Marguellil Watershed Project and later on a program to increase the country's wheat production.

Oued Marguellil is an area in central Tunisia that averages less than 12 inches of rain annually, most of which falls in torrential downpours in winter. These cause both floods and soil erosion. More than half of the almost 400,000-acre watershed is potential rangeland, but overuse of natural vegetation makes much of the land vulnerable to severe erosion.

The Oued Marguellil Pilot Watershed Project, begun in 1962, provides both flood control and a conservation plan for the area's cropland and rangeland. The plan calls for extensive application of such land-treatment measures as terraces, diversions, and waterways and the re-establishment of grass and other pasture-improvement measures.

Eighteen ponds have been built to supply local people and their livestock with water, and a 100-acre seed-production center is part of the project.

Twenty-three SCS people worked on the project at different times, but it is now run entirely by Tunisians.

The Oued Marguellil area experienced a 500-year frequency storm in September 1969, and, according to Anderson, most of the structural

work in the watershed project held. Many project ponds are located where they can help reduce stream-channel erosion by preventing overfalls from working their way into upland crop areas. Each pond also has a sediment pool to reduce silt damage to productive bottom lands.

Anderson worked 2½ years on the program to increase Tunisia's wheat production. He reports that average wheat production in that country has been around 5 quintals per hectare (7½ bushels per acre). In the past 3 years, some demonstration plots have produced up to 70 quintals of wheat per hectare (103 bushels per acre), and Tunisian farmers working a total of 50,000 hectares of their own land have produced an impressive 17 to 20 quintals per hectare (25 to 30 bushels per acre). The increase, claims Anderson, comes from new varieties, correct amounts of fertilizer, and improved cultivation methods.—Carolyn Johnston, Information Division, SCS, Washington, $D.C. \blacklozenge$

Review

Hydraulics of Sediment Transport. By Walter Hans Graf. 1971. McGraw-Hill Book Company, New York. 513 pp. \$22.50.

In this textbook Professor Graf has consolidated material from a great many sources, both domestic and foreign, into a convenient reference for the advanced researcher in the field of sediment transport as well as for the specialized engineer or geologist.

Part one summarizes the development of hydraulics. Part two concerns relationships between hydrodynamic forces and noncohesive sediment particles. Part three, which is the heart and major part of the book, discusses the entrainment of sediment into the water of an open channel and further consequences. Conditions for erosion, deposition, and stable channels are considered. One of the nine chapters in this part discusses cohesive-material channels and another, sediment sampling devices. Part four is about sediment transport in closed pipes.

This book will interest mainly design engineers and sedimentation geologists.—John N. Holeman, geologist, Engineering Division, SCS, Hyattsville, Md.

The Environmental Destruction of South Florida: A Handbook for Citizens. Edited by William Ross McCluney. 1971. University of Miami Press. 134 pp., 3 maps. Paperback, \$1.95.

Most of the environmental problems described in this graphic case study exist in almost all areas of the United States, but a few are unique to south Florida.

In this handbook are assembled the views of presumably some of the most knowledgeable south Florida conservationists and scientists. These experts offer—in everyday terminology — basic factual information about our environmental problems and specific suggestions for corrective action.

The editor and compiler, Ross McCluney, was actively involved in environmental problem-solving before Earth Day 1970 when the University of Miami, where McCluney is a graduate student in physics, hosted an environmental teach-in to alert the public to the growing threat of massive environmental destruction. The surge of grassroots concern following that Earth Day made the need for a citizen's handbook obvious to McCluney, and this book is the answer to that need.

The Environmental Destruction of South Florida is not just another publication on ecology for scientists or for crusaders—it is for the polluters and the polluted, which means all of us.—P.A.C.

New publications

Fluvial Sediment Concepts, Techniques of Water-Resource Investigations of the United States Geological Survey. By HAROLD P. GUY. 1970. U.S. Dept. Interior Book 3, Chapter C1. 55 pp., illus. First of a series concerned with the measurement and recording of information about fluvial sediment and with related environmental data needed to maintain and improve basic sediment knowledge. The concepts in this report involve the physical characteristics of sediment which include aspects relative to weathering, soils, etc.; sediment erosion, transport, and deposition characteristics; geo-

morphic considerations; economic aspects; and data needs and program objectives to be attained through the use of several kinds of sediment records.

Genetics of Black Walnut. By David T. Funk. 1970. USDA Forest Serv. Res. Paper WO-10. 13 pp., illus. Gives the sexual and asexual reproduction, genetics and breeding and improvement programs for the black walnut, native to most of the eastern half of the United States and southern Ontario between Lake Huron and Lake Ontario.

Animal Waste Reuse—Nutritive Value and Potential Problems From Feed Additives, a Review. 1971. USDA Agricultural Research Service, ARS 44-224. 56 pp. A report of literature on the nutritional value of animal wastes and the potential problems that may occur when compounds other than nutrients are added to animal feeds. Presents six articles by different authors.

Land Use Classification with Simulated Satellite Photography. By Donald J. Belcher, Ernest E. Hardy, and Elmer S. Phillips. 1971. USDA Agr. Inf. Bull. 352. 27 pp., illus. Discusses how imagery expected from the Earth Resources Technology Satellite (ERTS) was simulated by reducing conventional black and white aerial photographs to the small scales that would result in photographing large areas of the ground at satellite altitude. Small sections of the reduced negatives were then enlarged for land use interpretation tests.

The Principles of Planning Based on Soil Surveys. By Charles E. Kellogg. 1970. USDA Soil Conservation Service. 10 pp. Outlines briefly six principles that apply specifically to essentially all the planning work carried on with the use of soil surveys by people and their local governments.

Managing Our Environment. Prepared by Agricultural Research Service. 1971. USDA Agr. Inf. Bull. 351. 48 pp., illus. \$0.75. Deals with national priority—managing our environment—and covers some of the major challenges facing scientists and regulatory officials working in agricultural research. Specifically it presents ways agricultural research fights pollution: protecting land, water, and waterways; managing farm wastes; recycling food; processing wastes; and finding alternatives to pesticides.

Effect of Tree Windbreaks and Slat Barriers on Wind Velocity and Crop Yields. By E. J. GEORGE. 1971. USDA Agricultural Research Service Production Res. Rpt. 121. 23 pp., illus. \$0.25. Study conducted at Mandan, N. Dak., and in the eastern half of the state during 1959-68. Objectives were to determine (1) how tree windbreaks and barriers of different densities and orientations affect wind velocity, snow distribution, transpiration from crops, evaporation of water from soil, buildup of soil water on cropland, and crop yields; and (2) what procedures might be used to correct ineffective windbreaks.

Selected U.S. Crop Budgets—Yields, Inputs, and Variable Costs. By W. C. McArthur. 1971. USDA Economic Research Serv. ERS 457. 137 pp., illus. Vol. I, Southeast Region.

Selected U.S. Crop Budgets—Yields, Inputs, and Variable Costs. By Gaylord Worden, Ralph D. Tompkin, Richard A. Benson, William G. Bursch, and Boyd M. Buxton. 1971. USDA Economic Research Serv. ERS 458. 217 pp., illus. Vol II, North Central Region.

Selected U.S. Crop Budgets—Yields, Inputs, and Variable Costs. By Thomas A. Miller. 1971. USDA Economic Research Serv. ERS 459. 180 pp., illus. Vol. III, Great Plains Region.

Selected U.S. Crop Budgets—Yields, Inputs, and Variable Costs. By Leroy C. Rudge. 1971. USDA Economic Research Serv. ERS 460. 43 pp., illus. Vol. IV, Northwest Region.

Selected U.S. Crop Budgets—Yields, Inputs, and Variable Costs. By P. I. STRICKLAND AND R. LYNN HARWELL. 1971. USDA Economic Research Serv. ERS 461. 184 pp., illus. Vol. V, South Central Region.

Field Methods for Measurement of Fluvial Sediment, Techniques of Water-Resource Investigations of the United States Geological Survey. BY HAROLD P. GUY AND VERNON W. NORMAN. 1970. U.S. Dept. Interior Book 3, Chapter C2. 59 pp., illus. \$0.70. Describes field methods for the measurement of fluvial sediment and consists of two main sections: Sediment sampling equipment and sediment sampling techniques.

Birds Imported into the United States in 1968. BY RICHARD C. BANKS. 1970. U.S. Dept. Interior Special Scientific Rpt. Wildlife 136. 64 pp. In 1968 more than 490,000 individual birds were reported on forms filed with U.S. Customs. This list gives the number of each species of bird that was imported.

Fertilizer Use and Water Quality. G. STANFORD, C. B. ENGLAND, AND A. W. TAYLOR. 1970. USDA Agricultural Research Service ARS 41-168. 19 pp. Evaluates the role of nitrogen and phosphorus fertilizers in water pollution and summarizes the research on the complex relations between nutrient inputs and outputs.

Culture and Use of Grain Sorghum. By W. M. Ross and O. J. Webster. 1970. USDA Agr. Hbk. 385. 30 pp., illus. \$0.20. Grain sorghum is a major crop of the Great Plains and the Southwest. It is grown both as a dryland and as an irrigated crop. Superseding AIB 218, Culture and Utilization of Grain Sorghum, this publication gives in detail the methods used in producing the crop.

The Potential for Genetic Suppression of Insect Populations by Their Adaptations to Climate. By W. Klassen, J. F. Creech, and R. A. Bell. 1970. USDA Misc. Publ. 1178. 77 pp., illus. \$0.60. Study shows that a population may be suppressed by means of conditional lethal traits, particularly (1) when the population is held in check by partial sterility while conditional lethal genes are introduced, and (2) when the population is held static by conventional means while the conditional lethal genes are introduced.

Outdoor Recreation Research, a Reference Catalog, 1970. 1971. U.S. Dept. Interior, Bureau of Outdoor Recreation No. 4. 122 pp. \$1.25. 427 currently active or recently completed outdoor recreation and related environmental quality research projects listed, described briefly, and grouped into one of three categories—resources, economics, and user studies.

A Forest Atlas of the South. 1969. USDA Forest Service, Southern Forest Expt. Sta. (La.) and Southeastern Forest Expt. Sta. (N.C.). 27 pp., illus. Maps of resource areas, physical divisions, soils of the South, forest types, distribution of southern pines and hardwoods, proportion of land forested, national and state forests, annual precipitation, growingseason precipitation, potential evapotranspiration, water deficit, runoff and productive aguifers. January and July temperatures, freeze-free period, ice hazard areas, damaging tropical storms, forest insects, fire occurrence rates, and county maps.

Restricting the Use of Phenoxy Herbicides—Costs to Farmers. By Austin S. Fox, Robert P. Jenkins, Paul A. Andrilenas, John T. Holstun, and Ayton L. Klingman. 1970. USDA Economic Res: Serv. and Agr. Res. Serv. Agr. Econ. Rpt. 194. 32 pp. States that herbicide restriction would increase U.S. farmers' direct costs as much as \$290 million, assuming current levels of production, and about 20 million more hours of family labor would be used. Gives net reductions in farm income for many different crops.

Turning Points in Time. 1970. Soil Conservation Soc. of Amer. Proceedings of 25th anniv. meet. August 9-12, Toronto, Ontario. Soil Conserv. Soc. of Amer. 7515 Northeast Ankeny Road, Ankeny, Iowa 50021. 185 pp. \$5. The three sections—Turning Points in Time, Turning Points of Today, and Turning Points of Tomorrow-contain 15 articles and comments by specialists from federal, state, and local governments and from universities and private organizations in the United States and Canada. Seven students from five universities in the United States participated and presented papers in a student symposium.

Nationwide Inventory of Air Pollutant Emissions, 1968. 1970. U.S. Dept. Health, Education, and Welfare, Public Health Serv., Environ. Health Serv., Nat'l Air Pollution Control Admin. Publ. AP-73. 36 pp., illus. \$0.30. Estimates of the 1968 nationwide emissions of five primary air pollutants: carbon monoxide, sulfur oxides, particulates, hydrocarbons, and nitrogen oxides. Emission trends from 1966 through 1968 are included as well as motor vehicle emissions projected to 1990.

Ponds for Water Supply and Recreation. By the Soil Conservation Service. 1971. USDA Agr. Hbk. 387. 55 pp., illus. \$0.75. Outlines the requirements for developing a pond for water for livestock, irrigation, fish production, field and orchard spraying, fire protection, and recreation. Gives instructions for selecting the pond site, checking physical characteristics of the drainage area, estimating storm runoff, and constructing the pond.

Environmental Criteria for Electric Transmission Systems. 1970. USDA and U.S. Dept. of Interior. 52 pp., illus. \$0.65. Gives guidelines for Federal land-managing agencies in designing regulations and enforcing contractual standards of performance for construction and maintenance of transmission systems.

Cost Analysis of Six Water Desalting Processes. By C. F. Clark, Joseph J. Strobel, and E. F. Miller. 1969. U.S. Dept. of Interior, Office of Saline Water Res. and Develop. Prog. Rpt. 495. 100 pp., illus. \$1.

Equipment for Clearing Brush From Land. Rev. 1970. USDA Farmers' Bull. 2180. 12 pp., illus. Supersedes Farmers' Bulletin 1526, Clearing Land of Brush and Stumps. Describes some common types of equipment used to clear brush from areas of various sizes.

A Forest Atlas of the Northeast. By Howard W. Lull. 1968. USDA Forest Service, Northeastern Forest Experiment Station (Upper Darby, Pa.). 46 pp., illus. Description and maps of major forest regions, forest land distribution, physiographic regions, soils of the Northeast, mean annual total precipitation, mean annual total snowfall, average annual number of days with snow cover, mean daily maximum and minimum temperatures for January and July, mean length of freeze-free period, mean annual potential evapotranspiration, mean annual water surplus, density of population, federal and state forest lands, and forest influences.

Range Ecosystem Research, the Challenge of Change. 1970. USDA Agr. Inf. Bull. 346. 26 pp., illus. \$0.25. Range ecosystems are composed of communities of plants and animals in their natural environment. This publication presents a new look at the Nation's rangelands and their importance to all segments of society; outlines the direction Forest Service has chosen to take with rangeland research in that agency and explains the underlying philosophy.

Soil surveys

Mercer County, Pennsylvania. By Darrell G. Grice, Robert G. Grubb, and Orin W. Jaquish. 1971. 73 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Charles County, South Carolina. By E. N. MILLER, JR. 1971. 77 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by B. M. Long, J. E. McDonald, W. M. Steedly, W. M. Stuck, C. B. Ware, T. R. Love, and L. E. Andrew.

Meetings

The **Izaak Walton League's** 49th national convention will take place on July 7-9 in Anaheim, Calif.

A keynote session will cover discussions on ocean resources, a topic built around the convention theme "The Sea Around Us." The panel will include a number of well-known professionals in the marine resources field.

Action is the theme of the 1971-72 program of the National Federation of Business and Professional Women's Clubs, Inc. And "Era of Responsibility" continues the commitment of BPW to productive change while providing a great variety of projects from which an individual club can chart its course. Much of this will be presented at the annual meeting of BPW July 25-29 in Cleveland, Ohio.

One of the action programs is for a quality society. "Reducing smog, haze, smoke, and smaze and creating public understanding of the complex pattern of ecology . . ." will be the aim of BPW.

Dates and places

July

7-9, Izaak Walton League of America, Anaheim, Calif.

12-17, International Symposium on Useful Wildlife Shrubs, Logan, Utah.

17-21, American Association of Nurserymen, Dallas, Tex.

18-21, National Association of Counties Research Foundation, Milwaukee, Wis.

25-29, National Association of Business and Professional Women, Cleveland, Ohio.

29-31, Great Plains Conservation Council, Albuquerque, N. Mex.

August

4-6, Community Development Society, Stillwater, Okla.

8-11, National Farm and Power Equipment Dealers Association, Toronto, Canada.

11-13, Future Farmers of America, Kansas City, Mo.

15-18, American Agricultural Economics Association, Carbondale, Ill.

15-18, Soil Conservation Society of America, Columbus, Ohio.

15-19, Conservation Education Association, Ann Arbor, Mich.

15-20, American Society of Agronomy and Soil Science Society of America, New York, N.Y.

29-Sept. 3, American Institute of Biological Sciences, Inc., Ft. Collins, Colo.

29-Sept. 3, Ecological Society of America, Ft. Collins, Colo. ◆

Recon ...

So a new river basin study is published. What then? Pennsylvania STC Mel Davis decided not to let the Susquehanna study go unnoticed. He held six meetings in 3 days to explain the report to local people. More than 100 people including community leaders attended each session, held in courthouses. Mel's information tools included an advisory to his SCS staff giving hints on making meeting arrangements; a letter of invitation to local leaders; a press release; a full background statement; and a descriptive publication about the river-basin study for handout at the meetings. The result? Thousands of people learned of a major effort to help correct problems of inadequate water supply, stream pollution, poor land use, and shortage of recreation areas in eastern Pennsylvania and parts of New York and Maryland.

Sweet revenge. An Arizona cattle rancher discovered that vacationing campers had pitched their tent on a corner of his property during a 2-week period when he was away on business.

The campers left the area strewn with newspapers, cans, bottles, paper plates and napkins, plastic spoons and forks, cardboard boxes, milk cartons, and comic books.

Poking through the refuse, the rancher found an envelope with the name and address of a man who lived in the East. He wrote a letter, explaining that campers had left some "personal belongings" behind and that he'd be happy to send them if they would pay shipping charges. His offer was accepted with thanks.

The rancher jammed all the litter into a wooden packing crate and shipped it East, express collect. The bill was \$33.

Summer dropouts. The city and county of Honolulu has hired 1,272 high school and college students this summer to work in various ecology-related programs.

Theme of the summer project is "Hoolaulea Hoomanu," or "Celebration of Life." Activities range from fieldwork to investigation of various environmentally oriented ordinances and other legislation.

The program is conducted along the guidelines of the Environmental Protection Agency's SPARE (Summer Program for Action to Renew the Environment), which seeks to awaken youth to environmental problems and provide training for careers in environmental service.

Wyoming has joined the growing list of states that have changed the name of Soil and Water Conservation Districts to simply Conservation Districts. Also, the State Soil Conservation Committee was renamed State Conservation Commission. All cities and towns in Wyoming are now included in Conservation Districts.

Sweden's "right of public access to land" allows anyone to walk anywhere in the Swedish countryside, provided he causes no harm to crops, trees, and fences. Although areas around homes are private, forests and meadows are open to everybody—flowers and wild berries are free for the picking. But anybody who damages crops or trees can be prosecuted.

It's happening in New Hampshire. In Piermont, a zoning ordinance based on soil interpretation maps received voter approval by a 110 to 40 margin. The towns of Haverhill and Lyme have asked SCS

for help in making soil interpretation maps to be used as a basis for land use regulations. In Woodsville, a bank requires soils information on all applications for house-construction loans.

In Potomac, Maryland, a small group of residents—making up the Potomac Conservation Foundation—have hired an architectural firm to help them control the growth that threatens their town. The Foundation has been pitting itself against increasing pressures for development. So far, Potomac has been relatively unaffected by the development boom. It remains a reminder of the days when suburbs had no beltways or shopping centers.

The Department of Interior has decentralized the administration of the Land and Water Conservation Fund, the largest federal grant-inaid program for acquiring and developing public park, open space, and recreation lands and waters.

The responsibility for grant-in-aid project review and approval now rests with the six regional offices of Interior's Bureau of Outdoor Recreation. These offices are in Ann Arbor, Atlanta, Denver, Philadelphia, San Francisco, and Seattle.

Grants-in-aid under the Land and Water Conservation Fund can be made only to states, cities, counties, and legal political subdivisions. The federal money pays half the cost of statewide planning projects, land acquisition, and development of facilities for public outdoor recreation.

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From the Administrator:

"Doing our thing" in the planning process

People today attach a lot of importance to "doing your own thing." Many people are still searching for their proper role. But over a period of years, it seems to me that we have put the SCS contribution to the planning process in the proper focus. We do understand "our thing."

The articles in this issue of SOIL CON-SERVATION make it clear that even though we don't plan subdivisions, don't locate highways, or draw up urban master plans, we nevertheless are up to our ears in land use planning.

For one thing, SCS has leadership for the National Cooperative Soil Survey, and the soil survey, as the director of at least one regional planning commission has pointed out, "is the logical place to start the planning process."

It is also the logical place to start if you are a builder seeking a site for a housing project, or a school board trying to find a location for a new high school. Every organization with responsibility for community planning needs expert assistance on soils.

We also can provide authoritative information on water management and the control of water runoff. We can help stop soil erosion on construction sites and reduce the velocity of storm runoff. We know a lot about the ways in which water and various types of soil interact, and we are in a position to give planners sound advice on

alternative uses of land.

So this is a big part of the soil conservation thing—the ability to supply the rest of the planning team with scientific facts about soil and water and what happens when they get together.

Our contribution to the planning process doesn't end with furnishing facts. District leaders and SCS people also are experts at getting things done, in achieving practical results. If a planning session turns into an "all talk, no action" affair, soil conservation people tend to grow restless and impatient. That's to their credit. A plan that doesn't result in some sort of practical action isn't worth the paper it's written on. District people, in particular, often serve as catalysts in getting local people to stop talking and embark on programs of decisive action. Both the small watershed program and the RC&D program are proof of that.

Finally, I think that the experience of 36 years in some 3,000 conservation districts has taught our people something about the needs and desires of local communities, which should be kept in the forefront of every planning process.

So let's accelerate our actions and do our thing in land use planning and encourage other types of professionals with a contribution to make to do theirs.

Kenneth E. Grant